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CATALOGUE
OF
WELWITSCH'S AFRICAN PLANTS.
PART I.

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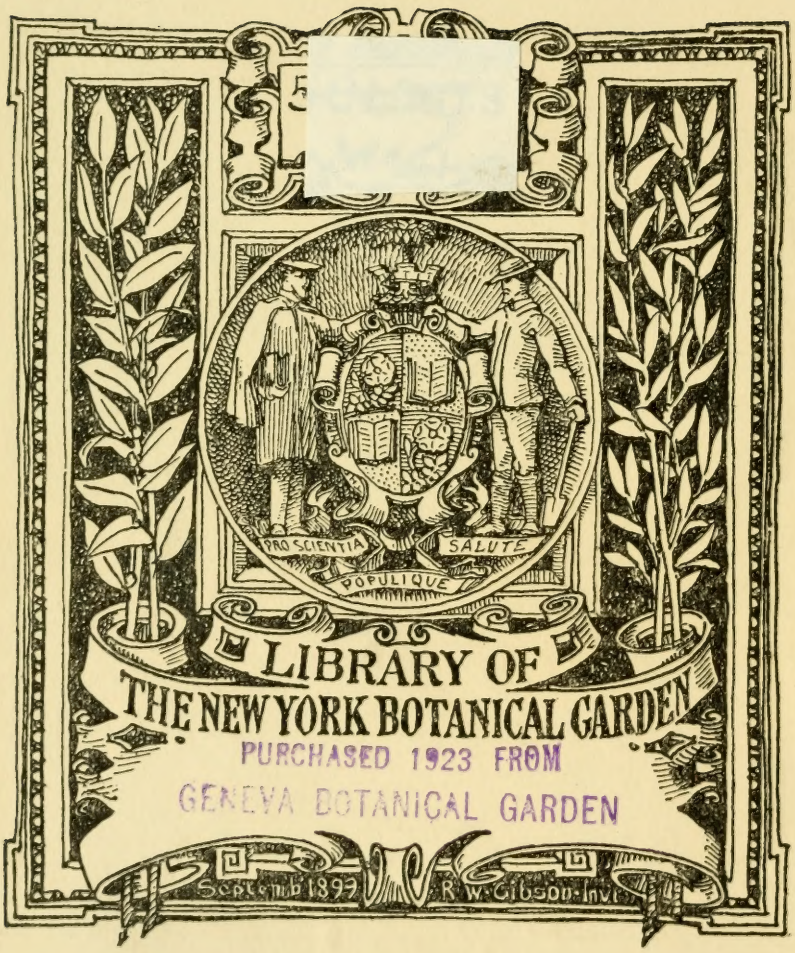
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AFRICAN PLANTS.

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George Murray ed.

CATALOGUE

OF THE

AFRICAN PLANTS

COLLECTED BY

DR. FRIEDRICH WELWITSCH
IN 1853-61.

DICOTYLEDONS, PART I.

BY

WILLIAM PHILIP HIERN, M.A., F.L.S.,
CORRESP. MEM. R. ACAD. LISE.

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Dept of Botany

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PREFACE.

DR. WELWITSCH, of whose African plants Mr. Hiern has prepared the following Catalogue, directed by his will (dated the 17th October 1872, three days before his death) that the study set of these plants should be offered to the British Museum for purchase. The Portuguese Government, however, claimed the whole of the Collections as belonging to them, and by letter dated the 31st October 1872 demanded delivery of the several cases of botanical specimens which were in the possession of Dr. Welwitsch at the time of his death. The acting executors—namely, Messrs. William Carruthers, at that time Keeper of this Department, and Frederick Justen, of Dulau & Co., booksellers, respectively—resisted this demand, and at great pecuniary risk to themselves personally defended a suit in Chancery, "Dom Luis the First, King of Portugal, *versus* Carruthers and Justen," which was filed on the 31st January 1873.

This suit came before the Court on several occasions; and the Judge having repeatedly expressed his opinion that a compromise ought to be effected, an agreement between the parties was arranged, and on the 17th November 1875 the Vice-Chancellor gave his decree accordingly. It was thus agreed that the Portuguese Government, on being declared to be entitled to the Collections, should express their willingness to give to the British Museum the best set, next after the study set, which was returned to Lisbon, of the botanical specimens and other objects of natural

history, with a copy of the notes and descriptions made by Welwitsch explanatory thereof or in reference thereto, on the condition of the British Museum contributing to the costs of separation and transcription. These notes and descriptions are largely incorporated in the Catalogue. The work of separation was entrusted to Mr. Hiern, who duly carried it out, and the transcription was done in this Department.

When the British Museum thus came into possession of the Collection, containing so large an amount of new and interesting material, it was thought desirable that a Catalogue of it should be published; and Mr. Hiern, who had already become acquainted with its contents while sorting and separating the specimens, undertook the work. He had made considerable progress with it when unforeseen circumstances compelled him to put it aside, and it remained many years in abeyance. Lately, however, owing to the great increase of interest in the flora of the African continent, it has been thought advisable that the treasures contained in so remarkable a collection should be published. Mr. Carruthers brought the matter again before the Trustees, and was fortunately able to induce Mr. Hiern to resume his work upon the Catalogue, and complete at least the Dicotyledons. These will be contained in Parts I. and II., and a third and concluding part will be devoted to the remaining groups—the Hepaticæ by Dr. F. Stephani, the Freshwater Algæ by Mr. W. West, and the rest by the staff of the Department of Botany.

Mr. Britten has rendered constant service in revising for the press.

GEORGE MURRAY.

December 1896.

INTRODUCTION.

Friedrich Welwitsch was born at Maria-Saal, near Klagenfurt, in Carinthia, Lower Austria, on the 5th February 1806. He was one of a large family, his father being the owner of an extensive farm. During his school age his father encouraged him in botanical tastes, intending him for the legal profession, and to this end sent him, in due course, to the University of Vienna. But an irresistible tendency towards Natural Science drew him from the Law, and he made no progress in legal learning. His father in his displeasure withdrew the allowance from the young student, who was then left to himself, and is said to have supported himself by writing critiques on the theatres. With a view to a more congenial living, however, Welwitsch entered the medical faculty of the University, and at the same time pursued Botany with increased assiduity. His first publication was "Observations on the Cryptogamic Flora of Lower Austria," which obtained a prize offered by the Mayor of Vienna in 1834. Somewhere about this period he was employed by the Government to report on the Cholera in Carinthia, and this proof of official confidence reconciled his father to his change of profession. For a while Welwitsch travelled as tutor with a nobleman, and then returned to Vienna to complete his studies. In 1836 he graduated in medicine, his thesis being a synopsis of the *Nostochineæ* of Lower Austria. At this time he was intimate with Fenzl and other Austrian botanists, and spent much time in the Botanical Museum at Vienna. After another period of tutorship, his course in life began to shape itself. After attending, in 1837, a meeting of the German Naturalists' Association—the model of our British Association—which he addressed on the subject of the geographical distribution of chalk plants on granite hills, his mind became fixed on foreign travel, and an opportunity presently offered itself to put his wishes into execution.

In 1839 Dr. Welwitsch accepted a commission from the Unio Itineraria of Würtemberg, of which he was a member, to explore and collect the plants of the Azores and Cape de Verde Islands; he was also induced to take this step because an act of youthful indiscretion on his part, in the course of enjoying too freely the gaieties of Vienna, rendered it expedient for him to leave Austria

for a time. He accordingly left Vienna, and reached England in June of that year, whence he shortly sailed for his destination. In July he arrived at Lisbon, where he found himself unexpectedly detained; he therefore employed the time in collecting the plants of the neighbourhood, and quickly formed an extensive collection. He seems to have taken a great liking for the country, and ultimately made arrangements for remaining in Portugal through the winter, instead of proceeding to the Atlantic Islands. In six weeks he acquired a good knowledge of the Portuguese language, and then more thoroughly devoted himself to the study of the local flora, visiting the Serras de Cintra, d'Arrabida, etc. On the 27th October 1839 he was elected an honorary member of the Pharmaceutical Society of Lisbon, and on the 18th June 1840 he received the diploma as corresponding member of the Society of Medical Science of Lisbon. He never returned to Austria, nor indeed left the place of his adoption, till 1853, except for short visits to Paris and London. During this period he had the care, at different times, of the Botanic Gardens of Lisbon and Coimbra, and was superintendent of the Duke of Palmella's gardens at Cintra and Alemtejo, as well as having the general supervision of the Duke's gardens throughout Portugal. He also explored a great part of the kingdom, and made very large collections, amounting at least to 11,000 specimens, which he forwarded to the Unio Itineraria. In August 1841 Welwitsch had the pleasure of meeting Robert Brown, who accompanied him for a three days' excursion to the Valle de Zebro; the remembrance of this was always pleasant to Welwitsch, who used to show with satisfaction a pocket lens which the great English botanist had given him on that occasion.

During the time he had charge of the royal garden and museum of Ajuda, near Lisbon, he rendered useful services, attaching names to the plants, etc. His intimate knowledge both of the theory and practice of botany, his acquaintance with algæ and mosses as well as with flowering plants, and his familiarity with the flora of the country, placed him in a unique position in Portugal. He was one of the founders of the Horticultural Society of Lisbon, which was established in July 1844.

In 1847 and 1848 Algarvia, the southernmost province of the kingdom, which had been little known to botanists, was explored. The lower plants were always the object of Dr. Welwitsch's special study. In the neighbourhood of Lisbon, in the years 1847-52, he added 250 of the larger Fungi to those enumerated in Brotero's "Flora," and in his zeal after Algæ, in which he found the Tagus very rich, he was accustomed to spend hours "up to his waist in water" day after day. He wrote in "Flora" of 1849 a note on *Arctotis acaulis* Brot.; he also contributed a useful paper to the Royal Academy of Sciences of Lisbon in 1850 on the Genera of Portuguese seaweeds. Besides his botanical investigation, Welwitsch devoted considerable time to the Mollusca and insects of Portugal, and formed large collections. With reference to

the Portuguese collections, Count Ficalho states, in Jornal de Sciencias, Lisbon, v. (No. xviii.) pp. 76, 77 (June 1875), that there exists in the Polytechnic School a valuable collection of plants collected and skilfully prepared by Dr. Welwitsch; that it contains the greater part of the cryptogams and not a few of the phanerogamic families; that the collection is very rich, and is furnished with manuscript notes; and that important information and details relating to the distribution of the species are due to this indefatigable and critical collector, such information being very deficient in nearly all the works previously published on the Portuguese flora.

It was in 1851 that the Government of Queen Dona Maria first resolved to explore the Portuguese possessions on the West Coast of Africa, with the double object of obtaining scientific information on the products of the country and of forwarding its material interests. The project was laid before the Cortès in that year, and on the 17th March it was duly passed. The Government was authorized to fix a monthly salary up to 200 milreis (£44 18*s.*) to a naturalist to be employed for the purpose; a capital expenditure of 1200 milreis (£269) was also allowed for the purchase of instruments, etc., and for the expenses of the voyage. The same year was that of the Great Exhibition of London; and Welwitsch, whose abilities and scientific acquirements had now generally become known and appreciated throughout Portugal, was engaged to prepare the contributions of that country. King Don Fernando was very active in forwarding the proposed expedition to Angola, and himself planned a scheme, the execution of which he entrusted to one or two of his ministers who comprehended and sympathised with his earnest desire for national progress and the prosperity of the colonies. For carrying out the scientific part of his scheme the King saw in Welwitsch the very man required for so difficult an undertaking. He had been so long in Portugal that his feelings were fully enlisted in the welfare and honour of his adopted country; a man of liberal culture and education, and a good linguist, he had proved himself a profound naturalist, as well as an admirable collector, and his administrative abilities had been shown in his conduct of the gardens under his care. Welwitsch was accordingly selected, and in 1851 proceeded to London to make preparations for his voyage. He spent some months here, and on the 28th May was elected corresponding member of the Royal Botanic Society of London. After receiving very valuable advice as to botanical travelling from Robert Brown and other botanists, he returned to Lisbon, and in due course started on his important mission, fully equipped, accredited with full powers by the home Government, and entrusted with complete liberty of action. How well the King had chosen was abundantly proved during the next seven years, throughout which Welwitsch showed an amount of enthusiasm, perseverance, and endurance of hardships which could scarcely be surpassed. The decree of appointment, dated 10th April 1852, referred to

the distinguished learning acquired by Welwitsch, and to the important studies which he had made on the flora and fauna of Portugal.

On the voyage from Lisbon, which he left on the 8th August 1853, he had the opportunity of visiting Madeira (12th to 14th August), the Cape Verde Islands (20th to 24th August), Sierra Leone (29th August to 6th September), Prince's Island (15th to 22nd September), and the Island of St. Thomas (23rd September); at Freetown, in Sierra Leone, he first became acquainted with a thoroughly tropical vegetation. He reached Loanda, the capital of Angola, on the 30th September 1853, and, making that town the base of his operations, he at once undertook a series of excursions in every direction, collecting plants especially, but also Hymenoptera, beetles, and other insects, as well as Mollusca, and the higher animals. His attention was naturally directed to the country near the coast, which he carefully explored from the mouth of the Quizembo, a little to the north of Ambriz (about 8° 15′ S. lat.), where he remarked upon the absence of seaweeds, to the mouth of the Cuanza (about 9° 20′ S.). His first impressions will be found in a letter to Mr. Kippist, dated the 2nd March 1854, printed in the Proceedings of the Linnean Society.

In this letter he said that "it is much to be regretted that excursions in this country are attended with so much expense and such great inconveniences of all kinds. Although the Portuguese Government allow me £45 per month, I shall nevertheless be under the necessity of contracting heavy debts before I return to Europe, since everything is at least three times dearer than in London. As there are few roads, and fewer beasts of burden, all baggage, provisions, water, presses, paper, beds, cooking utensils, with the necessary articles for barter (*e.g.*, guns, brandy, cotton goods, glass-pearls, etc.) must be conveyed on the heads of negroes; so that even the shortest excursion of three or four days costs an enormous sum. Meanwhile my reliance is upon England; that is to say, I anticipate that my cases of living plants, insects, seeds, etc., as also a few herbaria of the flora of this neighbourhood, will be duly honoured; and in that hope I intend, within two or three weeks from this time, to make up a sample-collection for London."

An edict of the Colonial Government at Loanda, dated the 8th March 1854, appointed a Commission, of which Dr. Welwitsch was to act as chairman, to prepare and arrange a collection of natural products of the province of Angola, to be forwarded to the Portuguese section of the Paris Exhibition of 1855, and to undertake for this purpose the necessary exploration, examination and analysis.

In the Boletim do Conselho Utramarino of Lisbon for the 7th August 1854, Welwitsch published a list of some of the seeds of plants which he had collected in the course of his travels up to that time, and which he forwarded to the Botanical Garden

of the University of Coimbra; in recognition of this service he was on the 1st March 1855 elected Corresponding Fellow of the Coimbra Institute.

He devoted nearly a year to the thorough investigation of the maritime zone, and then started, on the 10th September 1854, for the interior, following the course of the Bengo. Having reached the district of Golungo Alto, he ultimately fixed himself at a place called Sange, about 125 miles from the coast, in a mountainous region, whence he made excursions to Cazengo, on the banks of the Luinha, and numerous other expeditions, often extended to great distances. During his stay here he for some weeks enjoyed the company of Livingstone, who, in his book of missionary travels, bore testimony to Welwitsch's arduous labours and abilities. Two years were occupied in Golungo Alto with these laborious explorations through almost impenetrable forests, during which Welwitsch suffered repeatedly and severely from endemic fevers, scurvy, and ulcerated legs, the usual concomitants of African travel; but he never abandoned his work. In this mountainous region, whose highest peaks rise more than 2000 feet, above 300 different species of trees and more than 400 kinds of climbing plants, closely entwined, form a magnificent primeval forest, the ground being luxuriantly overgrown with more than 60 species of ferns, partly of arborescent forms.

On the 11th October 1856, Welwitsch left Golungo Alto, and, travelling south-west through the district of Ambaca, which he found full of novelties, reached Pungo Andongo on the 18th October. Of this stage of his explorations he gave a graphic sketch, in Andrew Murray's *Journal of Travel*, in a paper on the "Black Rocks" of the district, from which it received its old name of the Presidio das Pedras Negras. The annual blackening, after each rainy season, of these masses of gneiss, 300 to 600 feet in height, he found to be caused by the immense increase and downward spread of a minute filamentous alga (*Scytonema chorographicum*), existing in ponds at the summit. The flora of this "beautiful secluded El Dorado" is described in glowing terms by the traveller. "I should call Pungo Andongo a botanical garden, in form of an extensive park, in which are found the most interesting treasures of vegetation, from the various districts of tropical and subtropical forms of vegetation, judiciously grouped together, with a considerable number of forms of vegetation quite peculiar to itself."

Making this paradise a centre, he passed nearly eight months in traversing the district in every direction, crossing the singular range of Pedras de Guinga (27th January 1857), the banks of the Lombe (7th and 8th March) and the Cuige, and penetrating as far as the charming islands of Calemba (12th to 16th March), in the Cuanza, and the immense forests which stretch from Quisonde to Condo (12th to 17th March), near the cataracts of the river Cuanza. This point, about 250 miles from the coast, was the farthest to the east reached. On his way back to Pungo

Andongo, Welwitsch visited the salt lakes of Quitage and the magnificent forests on the right bank of the Cuanza; and, during a short stay at Pungo Andongo, explored the forests beyond the river Luxillo (28th April), and in the direction of Cambambe. After this he returned through Ambaca to his old station at Golungo Alto (11th June 1857), intending to explore the banks of the river Lucala and region of Duque de Bragança to the eastwards. But on the first night of the expedition he was deserted by half his men, and the remainder refused to advance. To his great regret he was therefore obliged to abandon the enterprise and to return to Sange, where he devoted several weeks to the arrangement of his collections. Thence he travelled back to Loanda, starting on the 27th August, and reaching it on the 7th September 1857, suffered five weeks of fever, after having completed three years of difficult explorations. Up to this time the territory explored by Welwitsch comprised a triangle, of which the base, of about 120 geographical miles, occupied the coast, whilst the apex was the point already mentioned at Quisonde, on the right bank of the Cuanza.

In a letter to his friend W. W. Saunders, dated 10th February 1858, he said that he could have worked more effectually during his long stay in equinoctial Africa if he had not had to fight again and again with fever, scurvy, and dysentery; and that he had to penetrate the densest woods, to examine the deepest ravines, and to wander for miles slowly under a burning sun through marshy land, whilst ordinary travellers are carried along, lying comfortably in hammocks, only on roads.

During his period of illness and forced inaction at Loanda, he corresponded with botanists, and in June 1858 drew up a valuable record of his travels, in the form of a Mappa Phyto-geographica, or tabular view of his botanical collections. This was published in Lisbon, towards the close of the year 1859, under the title of "Apontamentos Phyto-geographicos sobre a Flora da Provincia de Angola," in the unofficial part of the "Annaes do Conselho Ultramarino." From this paper we learn that he had, during his three years of travel, collected and arranged 3227 species of plants (to which 510 were afterwards added) in Angola proper. Under each family is given the whole number of species collected, followed by the number in each of the three regions—littoral, montane, and high tableland—into which for scientific purposes he had divided the country. This is accompanied by lists of cultivated plants in each family, and notes on the distribution and most characteristic species found. Many new species are first mentioned or described in the appendix which concludes this concise but comprehensive treatise. Successful as had been the scientific results of these travels, they had been attained only at the price of shattered health, and rest was absolutely necessary. A trip in September 1858 to the district of Libongo, north of Loanda, was the principal journey made till June 1859, when his health having been somewhat

restored, though still suffering from fever, Welwitsch recommenced his explorations in another direction. His intention was to investigate the littoral region of Benguella and Mossamedes only; but his travels, fortunately for science, extended over a greater extent of country. After a short time passed at Benguella, in lat. 12° 30′ S., he proceeded by sea to Mossamedes (Little Fish Bay, lat. 15° S.), where the magnificent climate speedily re-invigorated him; and he gradually extended his journeys, first along the coast as far south as Cape Negro, the port of Pinda, and the Bay of Tigers (lat. 17° S.), and afterwards, as the spring (October) approached, inland to the elevated plateau called Huilla, about eighty miles from the coast, which rises to the height of from about 5800 to 6000 ft. above the sea-level. A short sketch of the vegetation of the coast region is given in a published letter to Sir William J. Hooker, dated the 16th August 1860, after Welwitsch's return to Loanda. The remarkable differences between its flora and that of Angola proper are very striking even at Benguella, and at Mossamedes an entirely new littoral vegetation appeared. Here he found "a motley mixture of various floras, with a prevailing correspondence to those of Senegambia and the Cape of Good Hope. . . . At a distance of a mile from the coast, however, the forms characteristic of the Cape flora are lost; the vegetation becomes with every step richer in purely tropical forms, which are especially developed on the banks of the Bero, in a variety one would never have imagined in so apparently dry a coast region." Farther south this dryness becomes more and more excessive, and the flora poorer and poorer, chiefly consisting of *Euphorbiæ*. As Cape Negro (lat. 15° 40′ S.) is approached, the coast rises to form a perfectly level plateau of about 3000 or 4000 ft. in height, and extending over six miles into the country, composed of a calcareous tufa scattered over with loose sandstone-shingle. The vegetation on this arid waste is scanty enough; but it was here that Welwitsch discovered that extraordinary plant which has rendered his name familiar to every botanist, and on which Sir Joseph Hooker based a remarkable memoir—the *Welwitschia mirabilis* Hook. f. (= *Tumboa Bainesii* Hook. f.) The sensations of the enthusiastic discoverer, when he first realised the extraordinary character of the plant he had found, were, as he has said, so overwhelming that he could do nothing but kneel down on the burning soil and gaze at it, half in fear lest a touch should prove it a figment of the imagination.

The vegetation of the highlands of Huilla, though bringing to light no such wonder as the *Tumboa*, produced quite as strong an impression on the mind of the traveller. Welwitsch started from Mossamedes on the 10th October 1859, and following the banks of the river Maiombo reached Bumbo, on the slopes of Serra da Chella, and crossing that chain at a height of 4200 ft., at the end of that month found himself on the tableland. "The entire appearance of the landscape, the aspect of forest and plain—

indeed, the whole character of the vegetation, was at once and entirely changed as though by magic. I fancied myself in a strange world. Everything about me would recall the delightful outlying mountains of Switzerland, did not numerous Melastomaceæ, Apocynaceæ, Combretaceæ, etc., remind me of the tropics." The intermingling of tropical, Cape, and European forms is indeed very striking in the extensive and beautiful flora of this mountainous country, watered with innumerable streams running to the south to join the Cacolovar, which flows into the Cunene, and covered with pasture lands always green and fresh; and the seven months spent in the district produced a very large addition to the flora of West Tropical Africa. An interesting account of the botany of Huilla, which bears a strong similarity to that of Abyssinia, is given in a letter to Alphonse de Candolle, dated 20th April 1861, written after Welwitsch's return to Portugal. Over 2000 specimens were collected in the province of Benguella, but his investigations in this attractive country were unceremoniously put to an end by a native war. The little colony of Lopollo in Huilla, founded about three years previously, was attacked by a large force of Munanos to the number of 15,000. They held it closely blockaded for two months, during which the little garrison, of which Welwitsch was a member, kept them bravely at bay, until at length they gave up the siege and contented themselves with carrying off all the flocks they could find and dispersing among the mountains. After this Welwitsch recrossed the Serra da Chella, and returned to Mossamedes and Loanda, whence, wounded and stricken with fever and dysentery, he embarked for Lisbon with his immense collections, arriving in the Tagus at the end of January 1861. His herbarium is undoubtedly the best and most extensive ever collected in Tropical Africa, whether regard be had to the intrinsic interest of the plants themselves, the care and judgment displayed in their selection and preservation, or the extent of the collection both in number of species and series of specimens, the intention being that the study set especially might illustrate so far as possible the various states and conditions of each species. He was in the habit of (in most cases) carefully describing their essential characters when gathered, so that his tickets convey an amount of information scarcely ever to be found in other collections.

On his return to Lisbon he was placed on Government committees for the improvement of cotton cultivation in Angola, and for the classification of the products of the Portuguese colonies to be forwarded to the London Great Exhibition of 1862. In connection with the latter purpose he printed in the Medical Gazette of Lisbon in 1862 a collection of notes on the 149 specimens of woods, drugs, and other objects from Angola, which he had selected for the International Exhibition; these notes were subsequently published as a separate edition, with some editorial alterations, under the title of "Synopse explicativa das amostras de Madeiras e Drogas medicinaes, etc." A gold medal was

awarded to Welwitsch by the Commissioners of the Exhibition in respect of these exhibits. He at once commenced in Lisbon the critical examination of his African herbarium; but he soon discovered that the complete study of the collections, which he reckoned in the botanical section alone to embrace more than 8000 objects, required comparison to be made with analogous collections in the museums of other countries, and that he should be obliged to travel outside the kingdom for such assistance. On the 1st July 1862 Welwitsch was admitted as an Associate of "Pollichia," a Rhineland natural history society. He had previously, on the 2nd December 1858, been elected an Associate of the Linnean Society of London, and on the 4th November 1859 a Foreign Corresponding Fellow of the Royal Academy of Science of Lisbon. His subsequent honours of this kind were: 1864, 5th January, Associate of the Imperial Zoological and Botanical Society of Vienna; 11th December, Corresponding Member of the Imperial Natural Science Society of Cherbourg; 1865, 4th May, Fellow of the Linnean Society of London; 1866, 11th January, Foreign Member of the Botanical Society of Edinburgh; and 1869, 1st January, Member of the Acad. Cæsar. Nat. Cur., under the cognomen of Brotero.

After visiting the International Exhibition of 1862, he obtained by decree of the 22nd July 1863 the necessary permission from the Portuguese Government "to go to England and other northern countries to finish several studies necessary for the publication of the results of his exploration in Angola," with a salary of £2 daily to be paid monthly to him in London. Accordingly, after attending to the packing of the collections, he left Lisbon on the 15th October 1863, and reached London on the 20th. Some idea of the bulk of the collections may be formed from the official decree of the 3rd November, in which the Portuguese Government mention 42 packages, each 3 ft. 4½ in. long, 1 ft. 6 in. high, and 1 ft. 6 in. wide, equivalent to about 319 cubic feet. It has been estimated that these collections contained upwards of 5000 species of plants and 3000 species of insects and animals, a very large proportion of which were wholly new to science; and of most of these he had numerous specimens. He at once made it the one object of the remaining part of his life to determine and arrange these enormous collections; he was completely absorbed in this occupation, and rarely talked on any other subject. In furtherance of the same object he had a very large correspondence with English and foreign botanists and naturalists, among others with H. G. Reichenbach of Hamburg about orchids, with Duby of Geneva about mosses, with Müller of Geneva about Euphorbiaceæ, with Seemann about Bignoniaceæ, with Felder of Vienna about butterflies, with Andrew Murray about Coleoptera, with Hegelmaier of Tubingen about Lemnaceæ, with Morelet of Lyons about Mollusca, with Alexander Braun about Characeæ, with H. Schott about Aroideæ, with D. Oliver about Lentibularieæ, with W. J. Hooker about ferns, with Alph. de Candelle about Campanulaceæ,

with Currey about Fungi, with Caspary about Nymphæaceæ, and with Bentham about Leguminosæ, etc.

After a time, however, the Portuguese Government became dissatisfied with the rate of progress made by Welwitsch, and especially because he had failed to send to the Government monthly reports on the same. By decree dated 28th December 1864 they informed him as follows:—

"1. That although it may be to the glory of Dr. Welwitsch and even to the honour of the Portuguese Government to give immediate publication to some monographs, the purpose of the exploration entrusted to him having been the formation of a collection of all the natural products of the soil of Angola and the acquisition of knowledge tending to the development of the said province, it is necessary to see at once to the full publication of all the knowledge acquired with regard to the natural history, and also to deposit in the Portuguese establishment a collection of such products, even though it may not as yet be quite complete, in order that the Portuguese Government may be able to justify to the legislative chambers and to the public the expense incurred and now incurring with the said exploration and to avoid the interruption of the same.

"2. That in virtue of the aforesaid it is necessary that Dr. Welwitsch should at once suggest what may be needful for the publication of the result of his scientific labours, pointing out the time when the printing of the publication is to commence, how the requisite engravings are to be prepared, and what amount it will be necessary to fix annually for the expenses of this publication, which will no doubt take some years to conclude."

The Portuguese Government subsequently became more urgent, and by decree dated the 20th December 1865 ordered Welwitsch either to return to Portugal or to state without delay the time necessary for him to remain out of Portugal in order to complete the arrangement of his collections; and by decree of the 16th February 1866 the Government took the extreme step of suspending his monthly salary.

Welwitsch, however, did not comply with these directions, but steadily continued his work in London, without any assistance from this time until his death, having to pay out of his own means the expenses of his various publications to which he had committed himself: for instance, the plates illustrating his *Sertum angolense*, published by the Linnean Society in 1869, cost him £130. His private resources were thus so reduced that he was left with only the barest subsistence; and, deeply pained by his treatment, he on the 8th May 1870 wrote to the Portuguese Colonial Minister a letter setting forth a succinct history of his labours and services, and asking to be allowed to resume official intercourse with the Portuguese authorities. In reply, a despatch dated 22nd October 1870 was sent, stating that it was considered indispensable that he should return to Lisbon, bringing with him all his collections, in order to publish there the results

of his scientific work; a sum of £60 was also paid to him on account of any subsidy to which he was entitled. He packed a great part of his herbarium, but had not afterwards sufficient means to undertake the journey to Portugal.

With the exception of a short visit to Paris in 1867, in connection with the Exhibition there, for which he made contributions for the preparation of the catalogue of the industrial products of the Portuguese section (in which will be found a great amount of previously unpublished matter), Welwitsch resided continuously in London from 1863, alone and devoted to his work, in spite of ill-health and suffering sufficient to have caused most men to seek rest and quiet. He died in London on the 20th October 1872, and was buried on the 24th of the same month in the Kensal Green cemetery. The executors have placed the following inscription on his tomb, surmounted by a *Tumboa* (*Welwitschia*) plant carved in relief :—

FREDERICUS WELWITSCH, M.D.,
BOTANICUS EXIMIUS,
FLORÆ ANGOLENSIS INVESTIGATORUM PRINCEPS,
NAT. IN CARINTHIA, 25 FEB. 1806,
OB. LONDINI, 20 OCT. 1872.

The correct date of birth is the 5th (not the 25th) February 1806, as is set out in an attested copy, dated Vienna, April 1839, of a certificate dated Maria Saal, the 31st March 1818.

For the purpose of this biographical sketch free use has been made of the late Dr. Trimen's paper in the *Journal of Botany*, 1871, pp. 1-11. The portrait prefixed is enlarged from a photograph taken August 1865.

DIVISIONS OF ANGOLA.

The province of Angola taken in the wide sense includes the whole of Portuguese or Lower Guinea in Tropical Africa, and lies between 5° 12′ and 17° 20′ S. lat., extending from the shores of the Atlantic Ocean into the interior of the continent to undefined distances, which Welwitsch estimated as varying from 230 to 400 English miles. The northern portion or district of Cabinda, which abuts on the coast between the rivers Caconda and Zaire, from 5° 12′ to 6° 10′ S. lat., was not visited by Welwitsch; in the district of the Congo, between the rivers Zaire and Loge, from 6° 10′ to 7° 50′ S. lat., he explored the coast at and about Ambriz, and his chief travels took place in Angola proper, which extends along the coast between the rivers Loge and Cuanza, from 7° 50′ to 9° 20′ S. lat. He also made extensive explorations in Benguella, which in its wider sense extends along the coast between the rivers Cuanza and Cunene, from 9° 20′ to 17° 20′ S. lat.

Welwitsch established three phytographical regions of the Angolan flora according to the limits of elevation: namely, the coast region, ranging from sea-level up to 1000 ft., the mountain-woodland region, from 1000 up to 2500 ft., and the highland region, from 2500 ft. upwards. The coast region includes the districts of Ambriz, Loanda, Icolo e Bengo, Barra do Bengo, Barra do Dande, Libongo, Benguella proper, and Mossamedes; the mountain-woodland region includes the districts of Cazengo, Golungo Alto, Ambaca, Zenza do Golungo, and Bumbo; and the highland region includes Pungo Andongo and Huilla.

The winter season, namely, from June to August, is marked by the absence of rain; storms usually begin in the middle or towards the end of September, the showery season extending to the end of November or middle of December; and the heavy rains occur in the autumn, that is, March and April.

The mean temperature of the air in Pungo Andongo and Huilla varies from 55° to 60° F., and in the less elevated districts from 77° to 80° F., except in Mossamedes, which is much cooler, and approaches the climate of the Cape of Good Hope.

BIBLIOGRAPHY.

THE bibliography is arranged under four heads, each in chronological order: I. (1—28) Welwitsch's published writings; II. (29—73) Other writers' publications exclusively or chiefly devoted to definite parts of Welwitsch's collections; III. (74—89) Other publications treating of parts of the collections which Welwitsch submitted to the several authors; IV. (90—94) Other Zoological publications relating to Welwitsch's specimens.

I. WELWITSCH'S PUBLISHED WRITINGS.

1. "Beiträge zur cryptogamischen Flora Unter-Oesterreichs," in *Beiträge zur Landeskunde Oesterreich's unter der Enns*, bd. 4; pp. 156—273: Vienna, 1834.

2. "Synopsis Nostochinearum Austriæ inferioris"; pp. 30: Vienna, 1836.

3. "Ueber geographische Verbreitung der Pflanzen auf Kalk-, dann Granitgebirgszugen," in *Deutsch. Naturf. Versamml. Bericht*, 1837, p. 167: Prague, 1838.

4. "*Arctotis acaulis* Brot. (vix Linn.) an *Cryptostema*? und andere subtropische Formen in Portugal," in *Flora* xxxii., No. 33 (7 Sept.), p. 528: Regensburg, 1849.

5. "Genera Phycearum Lusitaniæ," in *Actas Sess. Acad. Scienc. Lisb.* ii. pp. 106—117: Lisbon, 1850.

6. "Semina plantarum Africæ tropicæ occidentalis, in insulis Capitis Viridis, nec non in continente Africano, imprimis in regno Angolensi lecta," in *Bol. Cons. Ultramar.*: Lisbon, 7 August 1854.

7. "Relação das sementes de arvores, etc.," sent from Loanda on 9 Sept. 1854, in *Ann. Consilho Ultramar.*: Lisbon.

8. Translated extracts from a letter to R. Kippist, in *Proc. Linn. Soc.* ii. pp. 327—329: London, 7 Nov. 1854.

9. "Informação do Dr. Welwitsch sobre os seus trabalhos, etc." Golungo Alto on 9 Sept. 1856, in *Ann. Conselho Ultramar.*: Lisbon.

10. "Systematische Aufzählung der Süswasser-Algen des Erzherzugthums Oesterreich unter der Enns," in *Verhandl. Zool.-Bot. Ver.* vii. *Abhandl.* pp. 49—68: Vienna, 1857.

11. "Aphorismos ácerca da fundação dos jardins de acclimatação na ilha da Madeira e em Angola, na Africa austro-occidental," in *Jornal do Commercio*, No. 1487: Lisbon, 8 Sept. 1858.

12. "Carta sobre a cultura do algodão na provincia de Angola," in *Bol. Offic. Angola*, parte não official, No. 694 (15 Jan.); and No. 695 (22 Jan.), pp. 8, 9: Loanda, 1859.

13. Translated letters on "the vegetation of West Equinoctial Africa" to W. W. Saunders, dated 12 Sept. 1857 and 10 Feb. 1858 respectively, in *Journ. Linn. Soc.* iii. pp. 150—157: London, 1 Feb. 1859.

Some French extracts from these letters were contributed by Alph. de Candolle in *Archiv. Scienc. Phys. et Nat.*, nouv. pér., v. pp. 279, 280 : Geneva, July 1859.

14. "Apontamentos phyto-geographicos sobre a flora da provincia de Angola na Africa equinoccial servindo de relatorio preliminar ácerca da exploração botanica da mesma provincia," in *Ann. Conselho Ultramar.* No. 55 Dec. 1858, parte não official, pp. 527—593 : Lisbon, 1859.

15. "Extract from a letter, addressed to Sir William J. Hooker, on the botany of Benguela, Mossamedes, etc., in Western Africa," dated 16 August 1860 from Loanda, in *Journ. Linn. Soc.* v. pp. 182—187 : London, 24 May 1861.

16. "Lettre à M. Alph. de Candolle sur la végétation du plateau de Huilla dans le Benguela," dated 20 April 1861 from Lisbon, translated from German into French, in *Archiv. Scienc. Phys. et Nat.*, nouv. pér., xi., pp. 195—203 : Geneva, July 1861.

Alph. de Candolle added some notes to the letter, and also observations on the subject, on pages 193—195 and 204—206 of the same volume.

17. "Cultura de algodão em Angola," in *Diario da Lisboa* No. 230 : Lisbon, 1861.

This was translated into English :—

"The cultivation of cotton in Angola," translated by A. R. Saraiva from the original official pamphlet published at Lisbon by order of the Portuguese Government ; pp. 16 : London, 1862.

[On the Oaks (*carvalho*) of Portugal : in Portuguese, 1861. See Trimen in *Journ. Bot.* 1873, p. 3 ; I have not seen any such paper.]

18. "Synopse explicativa das amostras de madeiras e drogas medicinaes e de outros objectos mormente ethnographicos colligidos na provincia de Angola enviados á exposição internacional de Londres em 1862 incluindo os que foram offerecidos ao gabinete Pharmacologico da escola medico-cirurgica de Lisboa ;" pp. 56 : Lisbon, 1862.

The preface, dated 20 Sept. 1862, explains that this is a separate edition, with some editorial alterations, of notes printed in the *Gazeta medica* of Lisbon, Nos. 14 to 17, in 1862.

19. "Carta sobre a *Pretrea zanguebarica e P. artemisiæfolia* Kl. in *Gazeta medica de Lisboa*, p. 474 : Lisbon, 1863."

20. "On a remarkable species of *Cissus* from the south of Benguella, with remarks on the Ampelideæ of Angola and Benguella," in *Journ. Linn. Soc.* viii. pp. 75—77 : London, 3 Sept. 1864.

21. "Observations on the origin and the geographical distribution of the Gum Copal in Angola, West Tropical Africa," in *Journ. Linn. Soc.* ix. pp. 287—302 : London, 14 June 1866.

22. "The Pedras Negras of Pungo Andongo in Angola," in Andr. Murray's *Journ. Trav.* i. pp. 22—36, pl. 1 : London, Feb. 1868.

23. "Fungi Angolenses." Part I. By Welwitsch and Currey, in *Trans. Linn. Soc.* xxvi., part i., pp. 279—294, tt. 17—20 : London, 1868.

This is all that was ever published, although it was intended in a subsequent paper to add the Hymenomycetes.

24. "Sur l'aspect et le caractère de la région littorale" (Note A), "Les lacs d' Angola" (B), "Influence des incendies sur la végétation et sur l'aspect de la campagne" (C), "Sur une monnaie de la côte de Guinée fabriquée avec une coquille" (E) ; in appendix to A. Morelet's *Mollusques terrestres et fluviatiles*, pp. 35—38, 47, 48 : Paris, 1868.

25. "Sertum Angolense, sive stirpium quarundam novarum vel minus cognitarum in itinere per Angolam et Benguellam observatarum descriptio iconibus illustrata," in *Trans. Linn. Soc.* xxvii., part i. pp. 1—94, tt. 1—25 : London, 1869.

26. "The Loranthaceæ of Angola," in *Gardeners' Chronicle*, p. 835, 1 July: London, 1871.

27. Notice of Count Solms Laubach's *Tentamen Bryogeographiæ Algarviæ, Regni Lusitani Provinciæ*, in *Journ. Bot.*, x., pp. 184—187: London, 1 June 1872.

28. "On an undescribed species of *Mesembryanthemum* from the south of Portugal" (posthumous), in *Journ. Bot.* xi., pp. 289, 290, t. 136: London, 1 Oct. 1873.

II. Other Writers' Publications, exclusively or chiefly devoted to definite parts of Welwitsch's Collections.

29. "Relatorio lido sobre o Herbario do Sñr. Dor. Welwitsch," by Dr. Bernardino Antonio Gomes, in *Act. Sess. Acad. Scienc. Lisb.* i. pp. 305—315: Lisbon, 1849.

30. "An enumeration of the Fungi collected in Portugal, 1842-50, by Dr. Fried. Welwitsch, with brief notes and descriptions of the new species," by Rev. M. J. Berkeley; pp. 10: London, 1853.

31. "An enumeration of the Musci and Hepaticæ, collected in Portugal, 1842-50, by Dr. Fried. Welwitsch, with brief notes and descriptions," by William Mitten; pp. 12: London, 1853.

32. "On *Welwitschia*, a new genus of Gnetaceæ," by Joseph Dalton Hooker, in *Trans. Linn. Soc.* xxiv., part 1, pp. 1—48, tt. 1—14: London, 1863.

33. "On the Spicula contained in the wood of the *Welwitschia*, and the Crystals pertaining to them," by Colonel Philip Yorke, in a letter to Dr. J. D. Hooker dated 4 Feb. 1863, in *Journ. Linn. Soc.* vii. pp. 106—108: London, 13 May 1863.

34. "On *Welwitschia*. Uma viagem scientifica em Angola," by Dr. B. A. Gomes: Lisbon, 1863.

35. "Bericht über einige der wichtigsten botanischen Ergebnisse der Bereisung der portugiesischen Colonie von Angola in Westafrika in den Jahren 1850—1860 durch Herrn Dr. Friedrich Welwitsch," by Dr. Prof. Fenzl, in *Sitzungsber. Akad. Wissensch.* xlviii., *Abth.* 1, pp. 104—114: Vienna, 1863.

36. "Welwitschii iter angolense. Euphorbiaceæ novæ a d. Welwitsch in Africa æquinoctiali occidentali lectæ," by Dr. J. Mueller (Muell. Arg.), in *Journ. Bot.* ii. pp. 326—339: London, Nov. 1864.

37. "Welwitschii iter angolense. Hederaceæ novæ a d. Welwitsch in Africa æquinoctiali occidentali lectæ," by Dr. B. Seemann, in *Journ. Bot.* iii. pp. 33, 34: London, Feb. 1865.

38. "Aroideæ novæ," by Dr. H. Schott, in *Journ. Bot.* iii. pp. 34, 35: London, Feb. 1865.

39. "Lemnacearum a d. Fr. Welwitsch in Africæ æquinoctialis territorio angolensi collectarum descriptio," by F. Hegelmaier, in *Journ. Bot.* iii. pp. 110—115, t. 29: London, April 1865.

40. "Dr. Welwitsch's Orchideen aus Angola," by H. G. Reichenbach, in *Flora*, xlviii., No. 12, pp. 177—191, 27 April 1865; l., No. 7, pp. 97—105, 15 March 1867, No. 8, pp. 113—115, 27 March 1867: Regensburg, 1865 and 1867.

41. "Note on the Mammalia observed by Dr. Welwitsch in Angola," by Dr. W. Peters, in *Zool. Soc. Proc.*, 1865, pp. 400, 401: London, August 1865.

42. "On the Lentibularieæ collected in Angola by Dr. Welwitsch, A.L.S., with an enumeration of the African species," by Professor Oliver, in *Journ. Linn. Soc.* ix. pp. 144—156: London, 12 Oct. 1865.

43. "Welwitschii iter angolense. Bignoniacearum a d. Fr. Welwitsch

in Africæ æquinoctialis territorio angolensi collectarum descriptio," by Dr. B. Seemann, in *Journ. Bot.* iii. pp. 329—333, tt. 35—40 : London, Nov. 1865.

44. "Coquilles nouvelles recueillies par le Dr. Fr. Welwitsch dans l'Afrique équatoriale, et particulièrement dans les provinces portugaises d'Angola et de Benguella," by A. Morelet, in *Journ. Conchyliol.* xiv. pp. 153—163 : Paris, 1 April 1866.

45. "Notice of a new Bat (*Scotophilus welwitschii*) from Angola," by Dr. J. E. Grey, in *Zool. Soc. Proc.*, 1866, p. 211, pl. 24 : London, Oct. 1866.

46. "Campanulacées du pays d'Angola recueillies par M. le Dr. Welwitsch," by Alph. de Candolle, in *Ann. Scienc. Nat.*, ser. 5, Bot. vi. pp. 323—333 : Paris, 1866.

47. "Voyage du Dr. Friederich Welwitsch . . . . Mollusques terrestres et fluviatiles," by Arthur Morelet ; pp. 102, tt. 9 : Paris, 1868.

48. "Lichenes angolenses Welwitschiani," by William Nylander, in *Bull. Soc. Linn. Normandie*, ser. 2, ii. pp. 508—521 : Caen, 1868.

49. "Voyage de M. Welwitsch à Angola, 1854—1860, d'après le *Sertum angolense*," by René Lucion, in *Belgique Horticole*, xxi. pp. 318—324 : Liége, 1871.

50. "Choix de Cryptogames exotiques nouvelles ou peu connues : Mousses," by J. E. Duby, in *Mém. Soc. Nat. Hist.* xxi. pp. 215—227, tt. 4 (1871), pp. 425—444, tt. 5 (1872) : Geneva, 1871-72.

51. "On a species of *Luzula* new to the flora of Europe discovered by Dr. F. Welwitsch, with a review of the Juncaceæ, collected by him in Portugal," by Henry Trimen in *Journ. Bot.* x. pp. 129—135, t. 122 : London, 1 May, 1872.

52. "As explorações phyto-geographicas da Africa Tropical . . . executadas pelo Dr. Friederich Welwitsch nos annos 1853 a 1861," by Bernardino Antonio Gomes, in *Jorn. Scienc. Lisboa*, iv., No. xiv., pp. 151—193 : Lisbon, Jan. 1873.

53. "On the development of the flowers of *Welwitschia mirabilis* Hook. fil.," by W. R. McNab, in *Trans. Linn. Soc.* xxviii. pp. 507—512, t. 40 : London, 1873.

54. "On *Physotrichia*, a new genus of Umbelliferæ from Angola," by W. P. Hiern, in *Journ. Bot.* xi. pp. 161, 162, t. 132 : London, 1 June 1873.

55. "Nymphæaceæ a Frederico Welwitsch in Angola lectæ," by Robert Caspary, in *Jorn. Scienc. Lisboa*, iv., No. xvi., pp. 312—327 : Lisbon, Dec. 1873.

56. "The Welwitsch Collections," (by the Editor in) *Journ. Bot.* xiii. pp. 380—382 : London, 1 Dec. 1874.

57. "Apontamentos para o estudo da Flora Portugueza," by Count Ficalho, in *Jorn. Scienc. Lisboa*, v. No. xviii. (June 1875), pp. 76—95, No. xix. (Jan 1876), pp. 129—145 ; vi., No. xxi. (March 1877), pp. 1—14, No. xxii. (Dec. 1877), pp. 81—96 ; vii., No. xxv. (May 1879), pp. 25—36, No. xxvi. (Nov. 1879), pp. 69—84 : Lisbon, 1875-79.

These notes were chiefly based upon the valuable collection of Portuguese plants collected and scientifically arranged by Welwitsch.

58. "The collections of the African scientific expedition ordered by the Portuguese Government in 1851, and the right of this Government to them, as brought before the English courts of justice," by Dr. B. A. Gomes, in *Jorn. Scienc. Lisboa*, v., No. xix., pp. 175—202 : Lisbon, Jan. 1876.

59. "Aves d'Angola encontradas nas collecções do Dr. Welwitsch,' by J. V. Barbazo du Bocage, in *Jorn. Scienc. Lisboa*, v., No. xx., pp. 258—263 : Lisbon, Dec. 1876.

60. "Statement regarding Dr. Welwitsch's Angola Reptiles," by

Dr. Albert Günther, in *Jorn. Scienc. Lisboa*, v., No. xx., pp. 275, 276 : Lisbon, Dec. 1876.

Following this statement is a further note (pp. 276, 277) in Portuguese, by J. V. Barboza du Bocage.

61. "Noticia de alguns productos vegetaes importantes ou pouco conhecidos da Africa Portugueza," by Count Ficalho, in *Jorn. Scienc. Lisboa*, vi., No. xxii., pp. 97—109 : Lisbon, Dec. 1877.

This paper makes large use of Welwitsch's published writings and manuscript notes.

62. "Report on the Liliaceæ, Iridaceæ, Hypoxidaceæ, and Hæmodoraceæ of Welwitsch's Angolan Herbarium," by J. G. Baker, in *Trans. Linn. Soc.*, series 2, i., part 5, pp. 245—273, tt. 34—36 : London, Jan. 1878.

63. "On the new Amaryllidaceæ of the Welwitsch and Schweinfurth expeditions," by J. G. Baker, in *Journ. Bot.* xvi., pp. 193—197, t. 197 : London, 1 July 1878.

64. "Études sur les insectes d'Angola qui se trouvent au Muséum National de Lisbonne," by Manuel Paulino de Oliveira, in *Jorn. Scienc. Lisboa*, vii., No. xxv., May 1879, pp. 37, 38 ; "Fam. Histeridæ," by L'Abbé de Marseul and Dr. Paulino de Oliveira, pp. 39—43 ; "Fam. Cantharidæ," by L'Abbé de Marseul, pp. 43—67 ; No. xxvii., Feb. 1880, "Fam. Lycides," by Joly Bourgeois, pp. 142—150 ; "Fam. Dytiscidæ," by M. Paulino d'Oliveira, pp. 151—154 ; "Fam. Gyrinidæ," by M. Paulino d'Oliveira, pp. 154, 155 ; "Fam. Hydrophilidæ," by M. Paulino d'Oliveira, pp. 156—158 ; viii., No. xxix., Dec. 1880, "Fam. Cicindelidæ et Carabidæ," by F. Putzeys, pp. 21—48 ; No. xxx., June 1881, "Ord. Orthoptères," by D. Ignacio Bolivar, pp. 107—119 ; ix., No. xxxiii., July 1882, "Fam. Scarabæidæ," by Manuel Paulino de Oliveira, pp. 40—52 ; x., No xxxviii, June 1884, "Cerambycides," by Manuel Paulino de Oliveira, pp. 109—117 : Lisbon, 1879—1884.

65. "*Phyllorachis*, a new genus of Gramineæ from Western Tropical Africa," by Henry Trimen, in *Journ. Bot.* xvii. pp. 353—355, t. 205 : London, 1 Dec. 1879.

66. "Hymenoptères," by O. Radoszkovsky, in *Jorn. Scienc. Lisboa*, viii., No. xxxi., pp. 197—221, cum tab. : Lisbon, Dec. 1881.

67. "The Cyperaceæ of the West Coast of Africa in the Welwitsch Herbarium," by Henry N. Ridley, in *Trans. Linn. Soc.*, series 2, ii., part vii., pp. 121—172, tt. 22, 23 : London, April 1884.

68. "Plantas uteis de Africa Portugueza," by Count Ficalho ; pp. 279 : Lisbon, 1884.

This work is a new edition of some articles which had been published in the *Bol. Soc. Geograph. Lisb.*, under the title of "Nomes vulgares de algumas plantas africanas principalmente angolenses" ; it is chiefly founded upon specimens of Welwitsch's African herbarium, and largely incorporates, with acknowledgment, his manuscript notes and other writings.

69. "Curculionides d'Angola," by W. Roelofs, in *Jorn. Scienc. Lisboa*, xii., No. xlv., pp. 48—56 : Lisbon, June 1887.

70. "Two new Tropical African Asclepiadeæ," by A. B. Rendle, in *Journ. Bot.* xxxii,, pp. 161, 162, t. 344 : London, 1 June 1894.

71. "New Tropical African Convolvulaceæ," by A. B. Rendle, in *Journ. Bot.*, xxxii., pp. 171—179 (1 June), and pp. 214, 215 (1 July) : London, 1894,

72. "The plants of Welwitsch's Apontamentos, etc.," by James Britten in *Journ. Bot.* xxxiii. pp. 70—77 (1 March) ; and a further paper under the same title, by W. P. Hiern, pp. 139—141 (1 May) : London, 1895.

73. "New African Asclepiads," by R. Schlechter and A. B. Rendle, in *Journ. Bot.* xxxiv. pp. 97—100, t. 358, fig. B.: London, 1 March 1896.

III. Other Publications treating of parts of the Collections which Welwitsch submitted to the several Authors.

74. "Die Eichen Europa's und des Orient's," by Dr. Theodor Kotschy; tt. 40, with descriptions in German and French: Vienna, 1862, n. 17.

75. "On the Palms of Western Tropical Africa," by Gustav Mann and Hermann Wendland, in *Trans. Linn. Soc.* xxiv. pp. 421—439, tt. 38—43: London, 1864.

76. "Description of three new Genera from West Tropical Africa, belonging to the natural orders Guttiferæ, Olacineæ, and Celastraceæ," by Professor Oliver, in *Journ. Linn. Soc.* x. pp. 42—44; read 20 Dec. 1866: London, 5 Sept. 1867.

77. "Synopsis Filicum," by Sir W. J. Hooker and J. G. Baker; pp. 482: London, 24 July to April 1868.

78. "Genera Plantarum," by G. Bentham and J. D. Hooker; i., part ii., pp. 433—725, Oct. 1865; part iii., pp. xv, 721—1040, Oct. ? 1867: London, 1865 and 1867.

Several new genera, based upon Welwitsch's African specimens, were first published in these parts.

79. "Description of some new genera and species of tropical Leguminosæ," by George Bentham, in *Trans. Linn. Soc.* xxv. part ii. pp. 279—320, tt. 33—40; London, 1865.

80. "Characeen Afrika's," by Alexander Braun, in *Monatsber. Preuss. Akad. Wissensch.* 1867, pp. 782—800, 873—944; Berlin, 1868.

81. "Refugium Botanicum," by W. Wilson Saunders; 5 volumes, 1868—1873; i. t. 16, *Uropetalum Welwitschii* Baker: London, April 1868.

82. "Filices Africanæ," by Maximilian Kuhn; pp. 233; Leipzig, 1868.

83. "A monograph of the Bambusaceæ, including descriptions of all the species," by Colonel Munro, in *Trans. Linn. Soc.* xxvi. pp. 1—157, tt. 1—6: London, 1868.

84. "Flora of Tropical Africa," by Daniel Oliver, assisted by other botanists; Vol. i., pp. 14, xli., 479, July 1868; Vol. ii. pp. viii, 613, Sept. 1871; Vol. iii. pp. viii, 544, Oct. 1877: London, 1868—77.

"For our material from Lower Guinea, we are almost wholly indebted to the courtesy of Dr. Friedrich Welwitsch, who, with rare liberality, has freely granted us the opportunity of inspecting his collections, which, in respect of judicious selection and admirable preservation, are without rival. His carefully accurate notes upon the fresh plants have also been at our service. Without the access to Dr. Welwitsch's Herbarium, this region would have been comparatively a blank in the present work. There remain but few Natural Orders treated of in the first volume, of which we have not had the opportunity of inspecting his specimens, and of these we may be able to embody the novelties in an Appendix. To this distinguished naturalist I tender the warmest thanks on behalf of my collaborators and myself." —Vol. i. preface p. 9*.

The very first species described in the book is one of Welwitsch; he also supplied his Angolan material for the elaboration of the following 30 out of the 46 Natural Orders included in the first volume: Ranunculaceæ, Dilleniaceæ, Anonaceæ, Nymphæaceæ, Cruciferæ, Cap-

paridaceæ, Violaceæ, Bixineæ, Pittosporeæ, Polygalaceæ, Caryophyllaceæ, Portulaceæ, Tamariscineæ, Elatineæ, Hypericineæ, Guttiferæ, Dipterocarpeæ, Malvaceæ (partly, only *Gossypium anomalum* Wawra), Sterculiaceæ (only *Leptonychia urophylla* Welw.), Tiliaceæ, Lineæ, Malpighiaceæ, Zygophylleæ, Geraniaceæ, Simarubeæ (partly), Olacineæ, Ilicineæ, Celastraceæ, Rhamneæ, and Ampelideæ.

For volume ii. Welwitsch supplied his African material for the following 16 out of the 21 Natural Orders included: Leguminosæ, Rosaceæ, Saxifragaceæ, Crassulaceæ, Droseraceæ, Myrothamnaceæ (Hamamelideæ), Halorageæ, Combretaceæ, Myrtaceæ (only *Petersia africana* Welw.), Lythraceæ, Samydaceæ, Passifloreæ, Cucurbitaceæ, Begoniaceæ, Cactaceæ, and Ficoideæ.

For volume iii. Welwitsch supplied his material for the following 7 out of the 14 Natural Orders included: Araliaceæ, Rubiaceæ (partly), Dipsaceæ, Compositæ (only *Gynura miniata* Welw.), Goodenovieæ, Campanulaceæ, and Ebenaceæ.

85. "Piperaceæ," by Cas. de Candolle, in de Candolle, *Prodr. Syst. Nat. Veg.* xvi., part 1, pp. 235[65]—471: Paris, 1869.

86. "Report on the Caoutchouc of Commerce," by James Collins; pp. xii, 47, with 2 maps and 4 plates: London, March 1873.

(p. 28.) "To Dr. Welwitsch . . . belongs the credit of first identifying the plants yielding African caoutchouc." Plate 4, *Landolphia owariensis* P. Beauv., was drawn from a specimen collected by Welwitsch.

87. "A monograph of Ebenaceæ," by W. P. Hiern, in *Trans. Cambr. Phil. Soc.* xii., Part 1, pp. 27—300, tt. 1—11: Cambridge, 1873.

On page 48 is given a list of 33 of Welwitsch's African plants belonging to this Order.

88. "Podostemaceæ," by H. A. Weddell, in De Candolle, *Prodr. Syst. Nat. Veg.* xvii., pp. 39—89: Paris, 16 Oct. 1873.

89. "Cytinaceæ," by J. D. Hooker, in De Candolle, *l.c.*, pp. 106—116.

IV. Other Zoological Publications relating to Welwitsch's Specimens.

90. "Aves das possessões portuguez da Africa occidental que existem no Museu de Lisboa," by J. V. Barboza du Bocage, in *Jorn. Scienc. Lisboa*, i. No. ii., March, pp. 129—153; No. iv., Dec., pp. 324—339, t. 6: Lisbon, 1867.

91. "Revision of the species of *Hyrax*, founded on the specimens in the British Museum," by Dr. J. E. Gray, in *Ann. and Mag. Nat. Hist.*, Series 4, i., No. i., pp. 35—51: London, Jan. 1868.

92. "Les Myriopodes d'Afrique au Museum de Lisbonne," by F. Santos Mattozo, in *Jorn. Scienc. Lisboa*, viii., No. xxxi., pp. 177—196, cum tab.: Lisbon, Dec. 1881.

93. "Ortopteros de Africa del Museo de Lisboa," by Ignacio Bolivar, in *Jorn. Scienc. Lisboa*, series 2, i., No. ii., Sept. 1889, pp. 73—112, cum tab.; No. iii., Dec. 1889, pp. 150—173; No. iv. March 1890, pp. 211—232, cum tab.: Lisbon, 1889-90.

94. "Les Damans d'Angola," by J. V. Barboza du Bocage, in *Jorn. Scienc. Lisboa*, series 2, i., No. iii.. pp. 186—196, cum tab.: Lisbon, Dec. 1889.

"Iter Welwitschianum: Lepidoptera Angolensia," by Rudolph Felder, of Vienna. The manuscript of this work was finished by the author, who died on 29th March 1871; but it does not appear to have been printed. See Dr. J. R. Schiner, in *Verh. Zool.-Bot. Gesellsch. Wien*, xxii. Abh. p. 45: Vienna, 1872.

ADDITIONS AND CORRECTIONS.

The following corrections in nomenclature should be made:—

Page 22, line 10, *instead of* **NYMPHÆA** Tournf. L. *read* **CASTALIA** Salisb. in Konig & Sims, Ann. Bot. ii. p. 71 (1805).—*Nymphæa* L. pro parte.

„ „ „ 11, *instead of* **N. Lotus** *read* **C. mystica** Salisb., *l.c.*, p. 73.—*Nymphæa Lotus.*

„ „ „ 4 from bottom, *instead of* **N. malabarica** *read* **C. stellaris** Salisb., *l.c.*, p. 72.—*Nymphæa malabarica.*

„ 24, „ 11, *instead of* **NASTURTIUM** *read* **RORIPPA** Gesner ex Scop. Fl. Carniol. edit. 1, p. 520 (1760).—*Nasturtium.*

„ „ „ 12, *instead of* **N. officinale** *read* **R. Nasturtium** Rusby, Mem. Torrey Bot. Club, iii. No. 3, p. 5 (1893) (*Roripa*).—*Nasturtium officinale.*

„ „ „ 24, *instead of* **N. indicum** *read* **R. indica.**—*Nasturtium indicum.*

„ „ „ 12 from bottom, *instead of* **N. humifusum** *read* **R. humifusa.**—*Nasturtium humifusum.*

„ 139, „ 13, *instead of* **D. retroversum** *Hiern*, sp. n. *read* **D. parvifolium** Engl. Bot. Jahrb. xxiii. p. 136 (15 Sept. 1896).

The following synonyms should be added:—

Page 112, *after* line 3, *Fagara Welwitschii* Engl. Bot. Jahrb. xxiii. p. 147 (1896).

„ „ line 7 from bottom, add *Z. horridum* Welw. ms. ex Ficalho, Pl. Uteis, p. 112 (1884).

„ „ *after* line 6 from bottom, *Fagara angolensis* Engl. Bot. Jahrb. xxiii. p. 148 (1896).

„ 114, *after* line 4, *Fagara ovatifoliolata* Engl. Bot. Jahrb. xxiii. p. 150 (1896).

„ „ *after* line 28, *Teclea grandifolia* Engl. Bot. Jahrb. xxiii. p. 153 (1896).

„ 117, *after* line 20 from bottom, *Vepris? angolensis* Engl. Bot. Jahrb. xxiii. p. 151 (1896).

I. RANUNCULACEÆ.

All the species of this natural order, which Welwitsch met with in Angola properly so called—that is, between the rivers Loge and Cuanza—inhabit the elevated regions in the interior of the country, and they belong exclusively to the genus *Clematis*, comprising three scandent species and one elegant erect bush.

The Ranunculaceæ in the Flora of Huilla, including the district of Bumbo, are represented by only three species of *Clematis* and one species of *Ranunculus*, thus by four species altogether; nevertheless they produce a striking effect upon the physiognomy of the forest landscape by the presence of immense masses of two erect species of *Clematis*, so that large tracts of pasture ground, situate amidst the forests, during the flowering season of these plants, look at a distance as if covered with snow; and this effect is enhanced by the white-flowering *Cephalaria centauroides* Roem. & Sch. (Welw. Herb. No. 522), which grows in company with them: this happens in the months of February and March, when extensive tracts of land are flooded after the rains which set in about October.

On February 8th, 1860, during an excursion towards the confluence of the streams Lopollo and Ferão, Welwitsch enjoyed ample opportunity to admire the scarcely imaginable magnificence of these species of *Clematis*; two species, each with whitish-red flowers 2 to $2\frac{1}{2}$ in. in diameter, and with stems 3 to 4 ft. high, are erect, whilst a third species climbs high up the forest trees and bears rather smaller white nodding flowers.

Ranunculaceæ are chiefly natives of cold or temperate zones, and even in these climates they are prominent only in mountainous regions of the northern hemisphere: it is therefore not surprising that in Portuguese Guinea, which belongs to the equinoctial zone of the southern hemisphere, this natural order is not plentifully represented, and is only seen in the interior uplands. At the same time the species here found are mostly shrubby, or at least woody at the base; the *Ranunculus* alone forms an exception. Some of the Angolan species of *Clematis* may be reckoned among the most beautiful species of the genus, partly on account of the luxuriance of their beautiful flowers and brilliant feathery tufts, with which in fruit they adorn the landscape.

Other families of plants, not specially belonging to the tropics,

when occurring in tropical countries, are generally represented by unattractive examples, as for instance in the case of Oxalideæ, Primulaceæ, Salicaceæ, etc.; the Ranunculaceæ, however, have representatives worthy of the tropics.

1. **CLEMATIS** L.; Benth. & Hook. f. Gen. Pl. i. p. 3 (1862).

This genus affords an illustration of what occurs in certain groups of plants, at least in tropical Africa—namely, that it is composed of species nearly always scandent in the shady and moist forests of the lowlands, but in the highlands and exposed regions provided with a poor sandy-rocky soil it is represented by species or their varieties remarkable for their erect habit. See Welwitsch, Sertum Angolense, in Trans. Linn. Soc. xxvii. p. 30, observ. (1869).

1. **C. chrysocarpa** Welw. apud Oliv. Fl. Trop. Afr. i. p. 5 (1868), pro parte.

C. villosa DC., *θ. chrysocarpa*, forms *stipulata* and *angolensis* O. Kuntze in Verh. Bot. Brandenb. xxvi. p. 174 (1885).

Huilla.—Erect, 1 to 1½ ft. high, sparingly branched; lower leaves simple, toothed towards the apex; upper leaves pinnately trifid; sepals 4 to 6, ovate-acuminate, white, 1½ in. long. In shortly bushy, rocky, rather dry stations, between Lopollo and Nene, at a place called Ferra de Sola, not abundant; fl. Feb., fr. April 1860. No. **1222.**

A perennial sparingly branched herb, 1½ to 2 ft. high, with large whitish flowers. In bushy, sandy pastures, near Lopollo, February and April 1860. Coll. Carp. 67.

To this species Oliver (*l.c.*) referred a specimen collected by Grant in the Usui district, 2½° S. Lat., and figured with this name in Trans. Linn. Soc. xxix. i. tab. 1 (1872); that specimen, however, differs from the type by its fruit having a much paler colour, and may perhaps belong to *C. Stuhlmanni* Hieron. in Engl. Pflanz. Ost-Afrik. C. p. 180 (1895).

2. **C. villosa** DC. Syst. Veg. i. p. 154 (1818); O. Kuntze in Verh. Bot. Brandenb. xxvi. p. 172 (1885).

C. Stanleyi Hook. Ic. Pl. t. 589 (1843); Oliv. Fl. Trop. Afr. i. p. 6.

Var. *ι.* **argentea** (Welw.) O. Kuntze, *l.c.*, p. 174. Form *a* **acutiloba** (Welw. ms.). Pungo Andongo.—A very beautiful plant, in the living state decked in all parts with a silvery lustre; stems numerous, from a woody root-stock strictly erect, 3 to 3½ ft. high; leaves pinnatisect, mostly 5-foliolate; leaflets acutely incise-toothed, sometimes 3-lobed. Frequent, in bushy stations about Quibinda, near Quisonda; fr. March 1857. No. **1220.**—Form *b* **obtusiloba** (Welw. ms.). Pungo Andongo.—Teeth and lobes of the leaflets obtuse, sometimes mucronulate. Collected with form *a*. No. **1220***b*.

Var. *κ.* **scabiosifolia** (DC.) O. Kuntze, *l.c.*, p. 174. Huilla.—A noble herb; stems cæspitose, erect, 2 to 4 ft. high, stout; leaves pinnatisect, rather rigid, 5-7-foliolate; flowers often clustered, with a feeble but agreeable odour; sepals 4 or 5, or occasionally 6, nearly an inch long, thick, whitish, or of a whitish-rose colour, or occasionally violet. Very abundant and variable; near Lopollo, in hot wooded stations, especially in ornamental woods composed of *Strychnos* and *Proteaceæ*; fl. Jan., fr. April 1860. No. **1221.**—Form **stenophylla**. Huilla.—Segments of the leaves narrower. With the last. No. **1221***b*.

To this variety apparently belong :—

Huilla.—(1) A perennial undershrub, with numerous erect stems, 3 to 4 ft. high. Lopollo, fr. 24 May 1860. Coll. Carp. 14. (2) An erect branched perennial herb ; stems numerous ; leaves divided ; flowers large, abundant, white or turning violet, together with other violet-coloured ones on the same plant. In wooded thickets, near Lopollo, abundant ; fr. middle of May 1860. Coll. Carp. 37.

3. **C. orientalis** L. Sp. Pl. edit. 1, p. 543 (1753); Hook. f. & Thoms. Fl. Indica, p. 9 (1855).

Var. γ. **Thunbergii** O. Kuntze in Verh. Bot. Brandenb. xxvi. p. 124 (1885).

C. Thunbergii Steud. Nomencl. Bot., edit. 2, i. p. 380 (1840); Harv. Thes. Cap. i. p. 6 t. viii. (1859); Oliv. Fl. Trop. Afr. i. p. 6.

Huilla.—In the more elevated wooded thickets, between Lopollo and Nene ; fl. Feb., fr. May 1860. No. **1215.**

This No. has been divided by O. Kuntze into two, 1215*a* and 1215*b* ; the former, 1215*a*, which has sepals nearly an inch in length, is the type of *C. commutata* O. Kuntze, *l.c.*, p. 128 ; the latter, 1215*b*, has sepals sometimes rather exceeding an inch in length.

By dense thickets in wooded situations between Catumba and Ohai ; in flower-bud in April 1860. An undershrub, more tomentose and almost velvety, and with stouter branches ; possibly a distinct species. No. **1216.**

Var. δ. **brachiata** (Thunb.), and var. ε. **Wightiana** (Wallich), O. Kuntze, *l.c.*, p. 125.

C. grata Oliv., *l.c.*, p. 7, non Wall.

Golungo Alto.—Near Carengue, in wooded stations amongst the mountains of the Eastern Queta ; fl. end of May 1856. No. **1207.** At the borders of forests in Sobato de Mussengue ; in flower-bud 12 June 1856. No. **1211.** Between Muria and Calôlo, on wooded bushy slopes ; fr. Sept. 1857. No. **1212.**

Cazengo.—Between Agnas Doces and Serra de Muxaûlo, in very dense and hot bushy stations, abundant ; in flower and young fruit June 1855. No. **1213.** Between Trombeta and Agnas Doces, June 1855 ; a unique specimen, not represented in the British Museum set. No. **1213***b*. Flowers numerous, small, white, thyrsoid ; fr. August and Sept. 1855 (fl. June and July). Coll. Carp. 175.

Pungo Andongo.—On the high rocks of Pedra Songue, and at their base, in bushy places ; fl. middle of April 1857. No. **1210.**

Var. ζ. **simensis** O. Kuntze, *l.c.*, p. 126.

C. simensis Fresen. in Mus. Senckenb. ii. p. 267 (1837); Oliv., *l.c.*, p. 6.

Bumbo.—Serra de Xella, in the more elevated wooded thickets, about 3000 ft. above sea-level, abundant ; in late flower in June 1860. No. **1214.**

4. **C. Welwitschii** Hiern apud O. Kuntze in Verh. Bot. Brandenb. xxvi. p. 171 (1885).

A somewhat pubescent shrubby climber, tall and widely spreading, woody at the base. Leaves bipinnatisect, 3-7-foliolate ; petiolules or rachis often much elongated and twisted like tendrils ; pinnæ mostly trifoliolate ; leaflets oval-oblong, obtuse, mucronate,

rounded, or the larger ones wedge-shaped at the base, 3-lobed or tridentate, with or without smaller distant teeth terminating the veinlets; teeth and lobes obtuse, mucronulate. Panicles terminal, erect; floral branches patent, trichotomous, cymose, bearing several pedicels, rather exceeding the leaves. Flowers white, rather more than an inch in diameter; buds rounded; sepals oval obtuse, spreading, tomentose on both sides, $\frac{1}{2}$ in. by $\frac{1}{3}$ in.; stamens $\frac{1}{3}$ in. long; filaments flattened, slender, glabrous in the upper part and shaggy in the lower; anthers linear, $\frac{1}{15}$ in. long, glabrous.

Pungo Andongo.—Near the river Cuanza, by thickets along the borders of little woods, in Sobato de Bumba, rather rare; in early flower at the end of March 1857. No. **1217**.

This is the plant mentioned by Oliver (p. 7) as perhaps allied to *C. grata*.

5. **C. pseudograndiflora** O. Kuntze in Verh. Bot. Brandenb. xxvi. p. 128 (1885).

C. grandiflora Oliv. Fl. Trop. Afr. i. p. 7, non DC.

Cazengo.—Near Cacula, in dense forests composed of *Coffea*, etc., in Mata de Cabondo, but not abundant; not yet in full flower in June 1855. No. **1218**.

Golungo Alto.—By wooded thickets, in the elevated stations of Sobato Quilombo-Quiacatubia, but rather rarely met with; fl. middle of July 1856. No. **1219**. In the primitive forests of Mata de Quisucula, very rare; fr. 8 Sept. 1855. No. **1219***b*.

2. **RANUNCULUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 5.

1. **R. pinnatus** Poir. in Lam. Encycl. Méth. vi. p. 126 (1804); Oliv. Fl. Trop. Afr. i. p. 9; Journ. Bot. 1896, p. 88.

R. pubescens Thunb. Fl. Cap. p. 443 (1823). *R. membranaceus* Fresen. in Mus. Senckenb. ii. p. 207 (1837). *R. striatus* Hochst. in Herb. Schimp. Abyss. i. n. 140; A. Rich. Tent. Fl. Abyss. i. p. 8 (1847).

Bumbo.—At the base of Serra da Xella, near Bumbo, in primitive very shady forests, alongside rivulets, not uncommon; not yet in flower Oct. 1859. No. **1209**.

Huilla.—Along the banks of the streams of the Lopollo country, in rich grassy stations annually flooded in the rainy season, at an elevation of 5000 ft., in company with *Satyrium Welwitschii* Rchb. f. (Welw. Herb. No. 726); fl. and fr. from Jan. to April 1860. No. **1208**.

Near Lopollo, fr. April 1860, by streams. Coll. Carp. 83.

II. DILLENIACEÆ.

In the district of Golungo Alto one or two species of *Tetracera* occur, but not very frequently, in the dense, hot, steaming, primitive forests near Sange, in the form of mighty creepers. In the district of Pungo Andongo an erect species of *Tetracera* occurs, an undershrub, a foot or rather more in height, with flowers three times as large as those of the Golungo Alto species. No other Dilleniaceæ were collected in Angola, and none are reported from Abyssinia.

1. **TETRACERA** L.; Benth. & Hook. f. Gen. Pl. i. p. 12.

The same connection between station and habit is manifested in this genus as in *Clematis*, the species of the shady forests of lower Angola being widely scandent, whereas that of the interior elevated region has a short erect or ascending stem. (See Welwitsch, Sertum Angolense, p. 30, observ.).

1. **T. obtusata** Planch. ex Oliv. Fl. Trop. Afr. i. p. 12.
T. alnifolia DC. Syst. Veg. i. p. 401 (1818), non Willd.

Sierra Leone.—A tall and widely climbing shrub; leaves mostly cuspidate; at the base of Sugar Loaf Mountains, near Freetown; without flowers or fruits Sept. 1853. No. **1205**.
The specimen is insufficient to make this identification certain.

2. **T. alnifolia** Willd. Sp. Pl. ii. p. 1243 (1799); Oliv. Fl. Trop. Afr. i. p. 12, cum syn., non DC.
T. Guillemini Steud. Nomencl., edit. 2, ii. p. 670 (1841). *T. Potatoria* Afz. ex Steud., *l.c.*

Golungo Alto.—A robust climbing shrub; trunk $2\frac{1}{2}$ in. in diam. at the base, twining, spirally embracing the trunks of other trees; branches sarmentose to a great distance; leaves repand-dentate or toothed. In the more elevated forests of the mountains of Serra de Alta Queta, rather rare; in flower and young fruit 21 May 1856; also at Sange, 23 May 1856; in company with *Dichapetalum angolense* Chodat (Welw. Herb. No. 4664). No. **1203**.

3. **T. Boiviniana** Baill. in Adans. vii. p. 300 t. 7 (1867); Oliv. Fl. Trop. Afr. i. p. 13; variety with glabrous carpels.

Pungo Andongo.—A shrub, 1 to 3 ft. high; stems numerous from the crown of the woody rootstock; branches erect or ascending; leaves rigidly coriaceous, rather rough on the upper surface; flowers white, large, fragrant; carpels dark, shining. In thickets on sandy clay, between the rivers Luxillo and Cuanza, sporadic; in flower and young fruit, or occasionally barren, in the middle of Dec. 1856. No. **1206**.
This plant is apparently the shrub alluded to by Welwitsch, Apontamentos, p. 554, as probably a new genus.

4. **Tetracera**, sp. ?

Golungo Alto.—A stout shrub, climbing far and widely; branches very long, winged in some parts; leaves deciduous, having the shape, size and margins of those of a chestnut. In dense, especially shady forests of the mountains of Serra de Alta Queta; without either flowers or fruits, May 1856. No. **1204**.

III. ANONACEÆ.

The Anonaceæ seldom descend to the coast region, and then only along the banks of the large rivers, but chiefly abound in the hilly and lower highland regions, where they enliven the primitive forests with the glossy verdure of their foliage, and with the gracefulness of their habit; many of them are fine climbers, and others form majestic trees, among which two species of *Monodora*, the "Gipepe" of the natives, are the most notable (Welw. Apont. p. 554). The Anonaceæ, by their luxu-

riant and many-coloured foliage, supply magnificent shades of colour to the primitive forests; and many of the species, by their fruits, which glow with the brightest scarlet-red, contribute to the peculiarities of the tropical flora; some of them, such as *Annona*, *Monodora*, etc., create admiration by the great size and woody consistency of their fruits; while others again, such as "Gipepe" and "Capella," become articles of commerce, and have been celebrated for centuries, by reason of the aromatic character of their seeds. They prefer the densest primitive forests, with the exception of *Annona senegalensis* Pers., which was always found on bushy hills alongside rivulets and in sunny situations.

Some species afford excellent timber, as for instance in the island of St. Thomas.

There have been observed in Huilla, between 4000 and 5510 ft. alt., only one *Xylopicrum* and one dwarf *Annona*, the latter of which appears to be spread over most mountainous regions of tropical South Africa, and, what is a rare occurrence, is almost everywhere called by the natives by the same name, "Maiolo," "Mailolo," etc.

1. **ANNONA** L.; Benth. & Hook. f. Gen. Pl. i. p. 27 (*Anona*).

The fruits of both the cultivated and wild species of this genus rank amongst the most esteemed of any fruits; some of them have been celebrated for centuries on account of their aromatic seeds. An indigenous species in Golungo Alto and Pungo Andongo is called "Anona ana" (dwarf Anona) by the colonists, and "Malolo" or "Maiolo" by the natives; it is well worthy of cultivation, having excellent fruit and a handsome appearance in that state. The arborescent species of the flora of Huilla and of the interior districts of Angola vary immensely in habit, as a consequence of the forest fires, which for ages wandering shepherds have repeatedly kindled. In the primitive woods, which have never been mutilated by the conflagrations, they have the proud bearing of noble trees; whereas the same species on the pastures after the forest-fires grow in secondary thickets only in dwarf forms, or as low bushes, often scarcely a palm or a foot in height, but in dense clumps; and even in such a state are found to be gaily flowering and fruiting. (See Welwitsch Sert. Angol. p. 17.)

1. **A. reticulata** L. Sp. Pl. edit. 2, p. 537 (1753); Oliv. Fl. Trop. Afr. i. p. 15.

Anona africana Chr. Smith in Tuckey, Congo, p. 28 (1818).

Icolo e Bengo.—A little tree, 6 ft. high; cultivated in the garden belonging to the convent of S. Antonio do Bengo, where it is said to have been introduced from Brazil; fl. Dec. 1853. "Fructo do Condo." No. 748.

Golungo Alto.—A small tree of 8 to 15 ft. in height, with spreading branches from near its base, or a tree of 20 ft.; flowers greenish-yellow; petals of the outer series occasionally 4, of the inner 1 or 2 feeble or wanting; fruit oblong or variable in shape, nearly smooth, green, pleasant to the taste. Almost always wild, but also cultivated;

in the denser secondary woods, chiefly along the river Cuango, between Sange and Undelle, sporadic; fl. Dec. 1855. No. **749**. Cultivated in the Governor's garden; fl. Nov. 1854; called "Fructo do Condo." A unique specimen. No. **749***b*.

The following is doubtfully referred to this species:—

Cape de Verde Islands.—Semi-spontaneous, and form on dense thickets, 10 ft. high and more, on the slopes of Val de S. Domingo with young fruit (not shown in the specimen) Jan. 1861. No. **751**.

2. **A. squamosa** L. Sp. Pl. edit. 1, p. 537 (1753); Oliv. Fl. Trop. Afr. i. p. 16.

Cultivated in Angola under the name of "Atta."

Novo Redondo.—Seeds sent to Loanda in Feb. 1858, cultivated. Coll. Carp. 176.

Island of Madeira.—Seeds, cultivated, Jan. 1863. Coll. Carp. 177.

During his travels in Angola Welwitsch never saw this species, either in the public markets or in private gardens.

3. **A. Cherimolia** Mill. Gard. Dict. edit. 8 (1768); Oliv. Fl. Trop. Afr. i. p. 16.

The Cherimolia, or "Fructo do Condo," was 150 years ago already a frequent table-fruit in Loanda, and one of the most esteemed fruits for dessert. Zucchelli, who dwelt in Angola and the Congo country as a missionary during several years from 1699, says with reference to this, after treating of several other tropical fruits, "Vi è parimente un' altro frutto assai guasto al palato, e quanto alla sanita, molto più salubre dell' Ananàs, quale con ogni sicurezza si può dare anche alle persone inferme, e *per essere stato portato qua dall' Indie Orientali da un Conte, si chiama comunemente frutto del Conte*" (Zucchelli, Relazioni del Viaggio e Missione di Congo, 1712, p. 110). It is a regular commodity in the fruit-markets of Loanda, Benguella, Bengo, and other towns on the coast; it must be numbered amongst the best and noblest fruits of the tropics; and it is further to be recommended because, when stored in cool, airy places, it will keep good for 6 to 8 days, and frequently longer, and by keeping acquires a still better flavour. In Angola it is the commonest of the cultivated species.

Bengo River.—Scales of the fruit sub-confluent, scarcely conspicuous in the ripe fruit. Fruit obtusely ovoid, 4 to 6 in. in the longer diam.; skin rather firm, green; ripe flesh pulpy, milk-white, delicious, with an excellent butter-aroma. Seeds, cultivated, Oct 1860. Coll. Carp. 90.

Golungo Alto.—Cultivated. Fruit delicious, Jan. and March 1855. "Fructo do Condo." Coll. Carp. 178.

4. **A. muricata** L. Sp. Pl. edit. 1, p. 536 (1753); Welw. Apontam. p. 587, n. 38, and p. 554; Oliv. Fl. Trop. Afr. i. p. 16; Monteiro, Angola, ii. p. 252 (1875).

A. asiatica L., *l.c.*, p. 537.

Barra do Dande.—Cultivated in gardens and orchards on the right bank of the river Dande, near Bondo (also in the districts of Barra do Bengo and Icolo e Bengo, but less frequently); fl. end of Sept. 1858; "Sap-sap" of the colonists. A unique specimen. No. **750**.

Island of St. Thomas.—In the wooded parts of Fazenda do Monte

Caffé, sub-spontaneous and cultivated; after the fall of the flowers, in Dec. 1860. "Sapo-sapo" or "Sap-sap" of the colonists. No. **750***b*.

Novo Redondo.—Seeds, at the end of Feb. and in June 1858. "Sour-sap" or "Sap-sap." Coll. Carp. 179.

The aromatic seeds of this plant are called "Empebi" by the natives (Monteiro, *l.c.*, p. 252); and the fruits are commonly sold in the market at Loanda, and are frequent in other parts of Angola (Monteiro, *l.c.*, and pp. 28, 297). The fruit is acid-sweet, not ungrateful in a tropical climate.

5. **A. palustris** L. Sp. Pl. edit. 2, p. 757 (1762); Oliv. Fl. Trop. Afr. i. p. 16.

Island of St. Thomas.—In the more elevated woods of Fazenda do Monte Caffé, without flowers and in leaf Dec. 1860; native name "Nona." A unique specimen. No. **752**.

Another doubtful *Anonacea* from the same island, in densely wooded parts of the same mountain, perhaps spontaneous, of which only two leaves were gathered, has the native name "Nona Concha." No. **753**.

6. **A. senegalensis** Pers., Syn. Pl. ii. p. 95 (1807); Oliv. Fl. Trop. Afr. i. p. 16.

Huilla.—A small shrub, varying from 9 in. to 2½ ft. in height; rhizome creeping, woody; stem sub-cæspitose; flowers greenish-yellow, sweet-scented; petals very deciduous; fruit pendulous, about the size of a pigeon's egg or often larger, of a fine orange colour. Near Lopollo, in the denser rather moist and also in the dry sandy thickets, more or less flooded in the summer, at an elevation of 5000 to 5200 ft.; in very late flower in Oct. 1859, in young fruit in Feb. 1860, and in ripe fruit in April 1860. Native name "Maiolo." No. **747**.

A shrub, 1 to 2 ft. high, with a creeping rhizome. Seeds, in Jan. 1860. Named in Huilla "Maiolo," and in Golungo Alto "Malolo." Coll. Carp. 11.

Cazengo.—In dry hot thickets near Caculo, abundant but rarely in fruit. Seeds. Coll. Carp. 181.

Var. **cuneata** Oliv., *l.c.* Golungo Alto.—A shrub, 1 to 3 ft. high, gregarious; leaves evergreen, mostly narrowed towards the base; flowers yellowish, fleshy, nodding; fruit glabrous, somewhat compressed, acutely scaly, of a golden colour; pulp juicy, edible, of an orange colour. Mostly in dry sandy situations, at the edges of forests and on the rocky banks of the rivulets of the mountain of Mongolo Xixe, and near Sange, luxuriating in a moist atmosphere; abundant; fl. Sept. and Oct. 1854, fr. from March to May 1855. Native name "Dilôlo-ambûlo." The fruit has a pleasant taste; it is mostly devoured before maturity by monkeys and negroes. No. **745**. A shrub, 1 to 3 ft. high, stems rarely branched; leaves large, elliptical; ripe fruit drooping, edible, delicious, as large as a small apple, orange-yellow; sarcocarp of the same colour, hard-spongy. Sange, Jan. 1855. Coll. Carp. 180. Ambaca.—At the river Lutete, in thickets; with young fruit in Oct. 1856. No. **746***b*.

Var. **glabrescens** Oliv., *l.c.*, p. 17. Pungo Andongo.—In hilly rocky elevated stations in the fortress, along streams, abundant at a place called Tunda Quilombo; fl. Jan. 1857. No. **746**. A shrub 1½ to 2½ ft. high; fruit of a deep orange colour, edible, pleasant. At Luxillo; fr. April 1857. Coll. Carp. 182.

2. **UVARIA** L.; Benth. & Hook. f., Gen. Pl. i. p. 23. Genus affine *Uvariæ* vel novum, Welw. Apontamentos, p. 592, n. 113.

1. **U. angolensis** Welw. ex Oliv., Fl. Trop. Afr. i. p. 23. *Uva angolensis* O. Kuntze, Rev. Gen. Pl. i. p. 7 (1891).

PUNGO ANDONGO.—A tall, climbing shrub; in the rocky woods of Barrancos de Catete, within the fortress, abundant; fl. Dec. 1856, fr. April 1857. No. **754**.

A shrub; branches either lax, slender, tortuous and elongated, or virgate and not scandent; flowers yellowish-red, very few, in Jan. and Feb. 1857. A unique specimen. No. **756**.

A small tree, 8 to 10 ft. high; branches and branchlets spreading; leaves bright-green above, paler and rather glossy beneath; flowers whitish-yellow; in very shady woods near the river Cuanza, between Condo and Quisonde, rather rare; fl. March 1857. No. **768**.

A stout shrub extensively climbing; leaves coriaceous, remarkably shining; flowers axillary, solitary, yellowish. Barranco Pedra Songue; fr. April 1857. COLL. CARP. 184.

3. **XYLOPICRUM** P. Browne, Jamaica, p. 250 (1756); *Xylopia* L.; Benth. & Hook. f. Gen. Pl. i. p. 28.

1. **X. africanum** O. Kuntze, Rev. Gen. Pl. i. p. 8 (1891).

Xylopia africana Oliv., Fl. Trop. Afr. i. p. 30. *Melodorum africanum*, Benth. in Trans. Linn. Soc. xxiii. p. 477 (1862).

ISLAND OF ST. THOMAS—A handsome tree; leaves coriaceous, shining, paler and sub-glaucescent beneath; petals valvate. In the more elevated dense primitive forests at Fazenda de Monte Caffé, about 1800 ft. above sea-level; sporadic; sparingly in flower and in young fruit in Dec. 1860. Native name, "Inhé branco." No. **764**.

2. **X. æthiopicum** O. Kuntze, *l.c.*

Xylopia æthiopica A. Rich, Hist. Cub. Bot., i. p. 53 (1845); Oliv., *l.c.* *Xilopia undulata* Pal. de Beauv. Fl. d'Owar, i. p. 27, t. 16, fig. 5 (1804) as to the fruit only.

GOLUNGO ALTO.—From the district of Hungo, on the north-eastern borders of Angola, whence the fruits are frequently exported by the inhabitants, who are called Mahungos. Fruits only, Sange, 1855. Negro name, "Capella" or "Cabella." No. **765**.

A shrub or small tree, with glaucous variously-coloured leaves. Serra de Alta Queta; seeds, April and June 1855. Name, "Cabéla pequena." COLL. CARP. 185.

A medicinal drug of the Mahungos, tonic and stimulant. Name, "Sabongo." Hungo. Fruits. COLL. CARP. 186.

A drug from Hungo. Name "Cabéla." COLL. CARP. 981.

Cabella.—This drug consists of the fruits of a tree of the family of Anonaceæ, which, as I was informed by the natives of the district of Golungo Alto, grows pretty frequently in the bordering lands of this district, especially in the territory of Hungo,—information which is confirmed by the circumstance of its being always the Mahungos who bring this drug to the markets of the coast, in the form of small rosaries, each of them selling for 50 to 150 Portuguese reals. These fruits give off an aromatic smell, strong and very agreeable, and the seeds which they contain, as well as all parts of the fruit, somewhat resemble in taste black pepper. The natives employ this spice in the seasoning of their food, as well as in the preparation of certain tonic or stomachic medicines. (Welw. Synopse p. 37.)

3. **X. odoratissimum** O. Kuntze, *l.c.*

Xylopia odoratissima Welw. ex Oliv., *l.c.*, 31; Welw. Sert. p. 12.

Huilla.—Bark bitter; flowers very fragrant, exceeded in the pleasantness of the aroma only by the species of *Schrebera* (Welw. Herb. nn. 933 to 939), but their fragrance far more intense. A stimulating and somewhat narcotic drink is prepared from a tepid infusion of the scarcely opened flowers. In wooded rocky mountainous stations on the southern side of Morro de Lopollo, abundant; fl. Dec. 1859 and Jan. and Feb. 1860, fr. April and May 1860. No. **757.**

In elevated woods, Lopollo; fr. Jan. 1860. Coll. Carp. 92.

It occurred in company with *Schrebera Saundersiæ* Harv., var. *tomentella*, in March 1860, in this situation, at an elevation of 5000 to 5600 ft. (See Welw., Sert. Angol., p. 42.)

4. **OXYMITRA** Hook. f. & Th.; Benth. & Hook. f. Gen. Pl. i. pp. 26, 957.

1. **O.? Welwitschii** Hiern; *Uvariæ* sp. nova? Oliv. Fl. Trop. Afr. i. p. 23.

An evergreen scandent shrub or a small tree 6 to 10 ft. high; young parts puberulous; branches glabrescent; leaves oval-oblong, obtusely narrowed or somewhat acuminate at the apex, rounded or obtusely narrowed at the base, nearly glabrate, thinly coriaceous, rigid, rather glossy, suggesting a species of *Pittosporum*, ranging up to 7 in. long by 2 in. broad; lateral veins very slender; midrib puberulous beneath; lower surface minutely glandular-dotted; margins narrowly thickened-revolute, puberulous; petiole $\frac{1}{12}$ to $\frac{1}{8}$ in. long, puberulous or glabrate; fruits solitary, lateral or terminating the branches, obsoletely tomentose; peduncle glabrate or dusty-puberulous, rather thick, $\frac{1}{2}$ to $1\frac{1}{2}$ in. long; carpels very numerous, stipitate, 1-2-seeded; ovules about 3, narrow, erect?; style lateral; nearly ripe carpels unsymmetrically globose or ovoid, scarcely $\frac{1}{2}$ in. in diameter; stipes radiating, $1\frac{1}{2}$ in. long; albumen of the seeds ruminated.

Cazengo.—In bushy wooded places and open thickets, near Caculo, and in Mata de Cabondo; with immature fruits in June 1855. No. **763.**

Pungo Andongo.—In the deep wooded valleys and in the shady clefts of the gigantic rocks of Barrancos da Pedra Songue; after the fall of the flower, in Jan. 1857. No. **769.**

2. **Oxymitra**, sp., near *O. patens* Benth. in Trans. Linn. Soc. xxiii. p. 471, t. 51 (1862); Oliv. Fl. Trop. Afr. i. p. 34.

Island of St. Thomas.—Fruit lateral; peduncle $\frac{1}{2}$ in. long; stipes of the carpels $\frac{1}{3}$ to $\frac{1}{2}$ in. long; albumen ruminated. The timber is principally employed for the manufacture of oars, etc., on account of its elasticity and durability in water. In the dense more elevated forests of Fazenda do Monte Caffé; with immature fruit in Dec. 1860. Name "Inhé preto." No. **755.**

5. **UNONA** L. f.; Benth. & Hook. f. Gen. Pl. i. p. 24.

1. **U. lucidula** Oliv. Fl. Trop. Afr. i. p. 35.

Golungo Alto.—One of the most beautiful bushes of the primitive forests, 5 to 10 ft. high, erect, or with lax patent or sub-pendulous branches; sometimes a small tree; leaves membranous-chartaceous

flowers dark yellow. In the densest damp forests of the mountains of Serra de Alta Queta ; abundant ; fl. April, fr. July 1855-6. No. **758**.

In tolerably dense forests, composed chiefly of *Acacia* and *Rubiaceæ*, among the mountains of Serra de Alta Queta, at a place called Mangue, with young fruit in May 1856. No. **767**.

A shrub, 5 to 7 ft. high, sometimes standing erect, at other times subscandent with elongate branches ; leaves remarkably bluish-glaucescent beneath ; fruit-carpels 2 to 6, moniliform, reticulate, scarlet. Serra de Alta Queta, April 1856. COLL. CARP. 193.

PUNGO ANDONGO.—In wooded, very shady, rocky places in Barrancos da Pedra Songe, sporadic ; fl. April 1857. No. **762**.

Var. **scandens**. A scandent shrub with narrower leaves. GOLUNGO ALTO.—In palm groves, composed of *Elæis guineensis* Jacq., along the banks of the river Quiapoza, near Sange, but very sparingly ; not yet flowering in March 1856. No. **770**.

2. **U. ferruginea** Oliv. Fl. Trop. Afr. i. p. 35.

GOLUNGO ALTO.—A widely climbing shrub with very long branches and ferruginous-tomentose flexuous branchlets ; fruits pendulous. In the dense more elevated primitive woods of Serra de Alta Queta ; fl. Feb., in young fruit August 1856 ; rather rare. No. **761**.

A shrub with the habit of a little tree, and elongate subscandent lateral branches ; in the primitive woods of Mata de Quisucula, near Bango Aquitamba ; fr. April 1855. No. **772**.

CAZENGO.—In the humid woods of the mountains of Serra de Muxaula, but sparingly ; fr. June 1855. No. **771**.

3. **U. parvifolia** Oliv. Fl. Trop. Afr. i. p. 36.

GOLUNGO ALTO.—A widely climbing shrub, conspicuous by the glaucous hue of its leaves ; branches slender, bent, or even recurved, purple as well as the branchlets ; joints of the torulose scarlet fruit-carpels readily separating. In the densest primitive forests, on the southern slopes of the mountains of Serra de Alta Queta, towards the river Luinha, abundant ; fl. Dec. 1855, fr. July and August 1855 and 1856 ; also on the northern slopes of Sobato de Bumba, towards the river Zenza ; fr. Jan. 1856. No. **760**.

A little weak shrub climbing on various trees in the denser forests of Sobato de Mussengue, sporadic ; sparingly in fruit in August 1855. A unique specimen. No. **759**.

4. **Unona**? sp., Oliv. Fl. Trop. Afr. i. p. 36.

A shrub, widely climbing ; branches and branchlets turning black, the ultimate ones often cirrhose-incurved ; leaves chartaceous-rigid, rather shining above, glaucescent beneath ; fruit bright scarlet ; carpels 1-seeded, or more rarely biarticulate-moniliform and 2-seeded.

PUNGO ANDONGO.—In dense shady wooded places, about Barrancos de Catete ; rather rare ; fr. end of Dec. 1856. No. **766**.

A stout shrub, climbing to a great height ; leaves lanceolate, glaucescent ; fruit pear-shaped oblong, of a brilliant scarlet colour ; pulp tinged with red. In forests near Catete, Dec. 1856. COLL. CARP. 183.

6. **MONODORA** Dunal ; Benth. & Hook. f. Gen. Pl. i. pp. 26, 957.

Welwitsch never saw a member of this genus above 4000 ft. above sea-level. The continued growth of the corolla, even after

fructification, is a prominent character in this genus. Each of the Angolan species is called by the negroes "N-pepe," the plural form of which name is "Jipepe," "Gipepe," or "Xipepe." The name is probably of Italian origin, *il pepe*, pepper, since the seeds of these plants are used by the negroes like pepper. It is well known that the negroes of Congo, Angola, etc., have adopted from the missionaries, who were Italians, a number of names for fruits, household utensils, etc., and have adapted them more or less to the structure of the Bunda language.

1. **M. Myristica** Dun. Monogr. Anon., p. 80 (1817); Welw. in Journ. Linn. Soc. iii. p. 151 (1859); Welw. Apont. pp. 582, 587; Welw. Synopse, pp. 30, 31; Oliv. Fl. Trop. Afr. i. p. 37; Welw. Sert. Angol. p. 11, obs.

Xilopia undulata P. Beauv. Fl. d'Owar i. p. 27, t. 16 (excl. fr.) (1804).

Var. **grandiflora**, *l.c.*, p. 38.

M. grandiflora Benth. in Trans. Linn. Soc. xxiii. p. 474, tabb. 52, 53 (1862).

A vast, very beautiful tree, 30 to 60 ft. high and more; trunk at the base 1 to 2½ ft. diam., erect, variegated with black and lead-colour; branches spreading, the lower ones at length turned down, those towards the apex of the trunk constituting an elongate-ovate crown; timber white, durable; leaves coriaceous, sometimes rigidly so, rather glossy above, glaucescent on both surfaces, quickly turning dark-coloured; the midrib as well as the somewhat channelled petioles and the young shoots finely reddish, suffused with a glaucous hue; flowers very handsome, at first nodding, at length pendulous; peduncle long, furnished in the middle with a broad lax hooded greenish bract, reddish at the base; calyx trifid; lobes subpetaloid, reflexed, keeled; corolla monopetalous, 6-parted; lobes all keeled, white at the base, undulate-crisped at the margin; outer ones variegated on the lamina with spots of flesh-colour and dark purple, as in *Tigridia Pavonia* Pers.; inner ones shorter, cordate-spathulate, connivent at the apex and margins, rather striate than spotted, hoary-glaucescent; stamens very numerous, densely crowded around the conical-cylindrical torus; anthers subsessile, whitish as well as the pollen-grains; ovary sessile on the apex of the torus, green, spherical, 1-celled, many-ovuled, terminating in a green, rather thick, sparingly pilose, more or less hemispherical stigma; capsule globose, nearly as big as a man's head, woody, very hard, pendulous, outside black, rather smooth; peduncle woody, 1½ to 2 ft. long.

Golungo Alto.—Sporadic but not unfrequent in dense primitive woods, from the bottom of valleys up to the highest ridges of mountains throughout the district, flowers from Nov. to Feb., fruits from March to May and August 1854 to 1857. Nos. **773, 777, 779, 780.** Coll. Carp. 187, 188.

St. Thomas Island.—In mountainous wooded places of Fazenda do Monte Caffé; without flower Dec. 1860; native name "Jobo" ("Schobo"). A unique specimen. No. **778.** In the elevated forests;

seeds collected in August 1861, and sent to Lisbon in Dec. 1861. COLL. CARP. 189.

The seeds of this fruit are much esteemed by the natives on account of their peculiar aroma, which resembles that of the nutmeg, and of which they frequently make use for various tonic, stimulating and stomachic medicines ; threaded rosaries of these seeds are met with in all the markets of the coast of Angola for inconsiderable prices when the caravans arrive from the interior, but they are much dearer at other times. These fruits come from one of the most handsome and bulky trees of the interior of the province, a remarkable ornament of the primitive forests of Golungo Alto, Cazengo, Alto Dande and Dembos (Welw. Synopse, pp. 30, 31).

2. **M. angolensis** Welw. in Journ. Linn. Soc. iii. pp. 151, 154 (1 Feb. 1859) ; Welw. Apont. pp. 582, 587 ; Welw. Synopse, p. 31 ; Oliv. Fl. Trop. Afr. i. p. 38 ; Welw. Sert. p. 10, tab. 1.

Var. *a*, **sempervirens** Oliv., *l.c.*, p. 39. Adult leaves rigid, thinly coriaceous, shining above, pale beneath, green, not glaucous, evergreen, 2 to 3 in. long ; petiole glaucous. PUNGO ANDONGO.—In wooded, rocky, elevated situations, by the clefts of the loftier rocks, on the eastern and southern sides of the fortress ; fl. Nov. 1856, with ripe fruit May 1857, sporadic and rather rare. No. **774**.

Var. *β*, **decidua.** Leaves sub-membranous or thinly coriaceous, sub-deciduous, 3 to 4 in. long. GOLUNGO ALTO.—In the more elevated primitive forests of Serra de Alta Queta, sporadic ; fl. middle of Dec. 1855. No. **776**.

Var. *γ*, **macrophylla.** Leaves coriaceous, dull-green and shining above, paler beneath, but not at all glaucous ; 4 to 7 in. long. PUNGO ANDONGO.—In wooded rocky places, at the east side of the fortress, behind Caghuy, where only one tree was seen ; in young fruit in Jan. 1857. No. **775**.

The following belong to this species :—

GOLUNGO ALTO AND CAZENGO.—Fruits globose, $3\frac{3}{4}$ in. in diam. In primitive forests, frequent. COLL. CARP. 192, 192*b*.

PUNGO ANDONGO.—A tree with papery not coriaceous leaves ; fruits ellipsoidal, longitudinally and sub-acutely ribbed, half the size of those in the last species. In the more elevated thin woods, sporadic. COLL. CARP. 190, 191.

Gipepe (Jipepe or Xipepe) de Songa.—Is a second species of *Monodora* which is distinguished from *M. Myristica*, besides other important characters, by the ellipsoidal form of the fruit ; this tree, which never attains so great dimensions as the Myristica of Golungo Alto, grows in the district of Pungo Andongo and in the country of the Musongos ; and its seeds are valued and employed by the natives in precisely the same manner as those of the above-mentioned species. —Welw. Synopse, p. 31.

IV. MENISPERMACEÆ.

The greater portion of Menispermaceæ inhabit the damp primitive woods of the mountainous region ; and all of those of Angola proper are handsome climbers, although their flowers are not conspicuous.

Welwitsch in his manuscripts remarks on the difficulty of

discovering flowering specimens of this Order because of the small size and usually green colour of the flowers, and on the difficulty of defining the species on account of their diœcious character; he also speaks of the great magnificence of the foliage of most of the species, and of the large quantity and deep red or orange colour of the fruit of several of them. Many species occur singly in the primitive forests, like hermits; their foliage mostly near the summit of the trees, with their flowers and fruits on the naked trunk or branches, mostly hidden in the densest thicket. Many possess healing qualities in the roots, stems, and fruits. Almost all have very tenacious stems, often 30 to 60 ft. in length, which are employed by the negroes as ropes, so that in some districts the species become rare or altogether disappear.

1. **CHASMANTHERA** Hochst.; Benth. & Hook. f. Gen. Pl. i. p. 34.

1. **C. strigosa** Welw. ms. in Herb.

A robust shrub, diœcious; stem $\frac{1}{2}$ to $\frac{2}{3}$ in. diam., at length, climbing high with weak flexuous strigose-hispid branches and branchlets, hanging down from trees as from a pillar; leaves orbicular, deeply auriculate-cordate at the base, palmately veined, quite entire or vaguely sinuous, 3-lobed, mucronate by excurrence of the veins (or retuse) at the apex of the leaf and of its vague lobes, membranous-chartaceous, strigose-hispid, 4 to 9 in. diam.; petiole rather shorter than the blade, hispid. Flowers in elongated slender hispidulous racemes. Male flowers about $\frac{1\frac{3}{4}}{10}$ in. diam. before expansion, on short slender unequal pedicels; in little clusters 3 to 4 together in the axils of the filiform-subulate bracts, which about equal the longer pedicels; racemes $1\frac{1}{2}$ to 2 ft. long; calyx 6-sepalous, in two series; the outer 3 narrow, sub-herbaceous, pilose-hispid outside, with golden-tawny hairs, the inner 3 broad, imbricated, subpetaloid, hispid along the middle of the back, obtuse, hooded at the apex and bearded with elongated golden hairs; petals 6, waxy-fleshy, greenish yellow, rather smaller than the interior sepals, all concave, glabrous, obtuse; stamens 6, central, united in a column, half way or nearly up to the insertion of the anthers, glabrous; anthers short, yellow, 2-celled, dehiscing longitudinally (vertically), cells opposite not confluent; ovary altogether deficient. Female flowers in shorter racemes than the male; pedicels solitary, firmer; calyx and corolla as in the male flowers, but $\frac{1}{3}$ larger in all parts; staminodes 6, free, without anthers; carpels 3, obliquely ovoid, rather compressed, glabrous, placed on a short fleshy gynophore, reddish brown, free at the base, united at the apex by the base of the styles; styles short, straight; stigmas bifid, reflexed; lobes more or less subulate, all directed outwards.

Golungo Alto.—Sporadic in the denser primitive woods, near the streams Delambra and Quiapoza, Sobato de Mussengue and Sobato da Bumbosa; with male flowers at the beginning of Nov. 1855, with female flowers in the middle of Nov. 1855, with fruit in May 1856 (in the British Museum ♂ only). No. **2326**.

Jateorhiza strigosa Miers, Contrib. iii. p. 29 (Oliv. Fl. Trop. Afr. i. p. 42), from Congo and Fernando Po, appears to differ.

The following may belong to this species:—

Golungo Alto.—A strong dicœcious shrub, climbing to a great height, and then hanging down; tomentum of the stem rufous-ferruginous; leaves more or less lobed after the fashion of species of *Croton*. Roadway near Mussengue; fr. Jan. 1856. Coll. Carp. 197.

2. **TILIACORA** Colebr.; Benth. & Hook. f. Gen. Pl. i. p. 36.

1. **T. chrysobotrya** Welw. ex Ficalho, Pl. Uteis Afric. Port. p. 87 (1884).

Cocculus sp., Welw. Synopse, p. 29, n. 69; *Triclisia chrysobotrya* Welw. ex Ficalho, *l.c.*

A robust glabrous arborescent shrub, climbing to a great height, evergreen; trunk at the base usually $\frac{1}{6}$ to $\frac{1}{2}$ ft. diam.; branches even thicker, voluble; bark dark-purple, glossy; branchlets very tenacious; leaves elliptical, acuminate or cuspidate, wedge-shaped at the base, coriaceous, rather glossy, of nearly the same colour on both surfaces, clearly 3-nerved at the base, $1\frac{1}{2}$ to $4\frac{1}{2}$ by $1\frac{1}{6}$ to $2\frac{1}{2}$ in.; petiole glabrous, $\frac{1}{3}$ to 1 in. long, usually bent or flexuous and slightly thickened near the apex; inflorescence cymose-racemose or paniculate, at length pendulous, elongated, issuing from the leafless trunk; branches slightly puberulous; flowers greenish. Male flowers: outer sepals 6 to 8, unequal, imbricated, pubescent; inner sepals 3, glabrous, thick, valvate in æstivation, shortly acute and hooded-inflected at the apex; petals 3, very small, spathulate, squamiform, alternating with the innermost sepals; stamens 6, three or more times the length of the petals; filaments flattened, more or less united at the base or free; anthers large, obtuse, cells longitudinally turgid; ovary altogether absent or occasionally represented by a bundle of hairs. Female flowers: carpels glabrous, 24 to 30 or more; styles subulate; fruit-carpels several (12), obovoid-oblong, gibbous, not much compressed laterally, glabrate; $1\frac{1}{2}$ in. long, shortly stipitate, drupaceous, orange-coloured, with smell and taste of the fruit of *Prunus Padus* L.; the scar of the style lateral, near the base, next the hilum; seed induplicate after the manner of the genus; albumen apparently ruminated.

Golungo Alto.—In primitive woods of Serra de Alta Queta, frequent but rarely flowering, fl. March 1856, fr. Feb. 1855. Native name "Xib" or "Abutûa." No. **2308**. Coll. Carp. 196 (partly).

Wood abnormal, almost as in Piperaceæ. Coll. Carp. 944.

The *Butua*, or *Abutua* as it is generally called, is a robust climber, and is met with in the virgin forests of the mountainous districts, and especially in those of Golungo Alto, Cazengo, and Dembos. The trunk of this shrub not rarely attains 1 to $1\frac{1}{2}$ ft. in circumference, and is of a very remarkable structure; the natives employ the pounded roots as well as the leaves, branchlets, bark of the trunk, and the fruits as a decoction against diarrhœa, gonorrhœa, and various other distempers, especially long-established syphilis, much commending the infallible efficacy of this remedy, which they moreover apply in cases of snake-

bites and as a sudorific in constipation. Welw. Synops. p. 29. Compare Welw. Apont. p. 554.

3. **CHONDODENDRON** Ruiz & Pav. Prodr. p. 132 (1794); non Benth. & Hook. f. Gen. Pl. i. p. 34.

1. **C. (?) macrophyllum** Hiern, sp. n.

An ample robust shrub, 10 to 15 ft. high, widely climbing, rather rigid; branches terete; shoots elongated, voluble, covered with a rusty velvety tomentum; older branches glabrescent; wood of the stem sometimes 2 in. in diam., very hard; branches very tenacious, and even after being dried for a long time remarkably elastic. Leaves orbicular or cordiform, cuspidate, broadly cordate or nearly rounded at the base, rigidly but thinly coriaceous, glabrate, bright green and very glossy above, beneath pale and with raised tawny-pubescent veins, ranging up to 6 by 5 in.; petiole spreading, rusty-tomentose, at the apex thickened and curved-reflexed, ranging up to 3 in. long. Flowers fragrant, sparse, met with on stems several years old; fruiting stems always without leaves up to the height of 6 to 8 ft., where the fresh ramifications begin. Male flowers clustered in short axillary racemes, short, sessile, surrounded by bracts exceeding the flowers, on all sides clothed with dense dark-golden hairs; outer sepals 15 or 18, orbicular-ovate or transversely oblong, obtuse, rather rigid, all imbricated, gradually greater inwards; the 6 taller ones, enveloping the petals, greater than any of the others and nearly equal among themselves, glabrous on the inner surface. Innermost sepals 3, valvate, altogether covered by the outer sepals, thick, rigid, including the stamens; petals 6, very small, shorter than or scarcely as long as the filaments, obovate, opposite to the filaments; stamens 6; filaments erect, shorter than the anthers, not cohering except the base; anthers erect, ovate-oblong, rather obtuse, introrse, longitudinally dehiscent; cells vertically adnate to the thick connective; ovary deficient, but represented by a little bundle of golden-tawny rigid fragile hairs in the centre of the flower. Female inflorescence lateral or axillary, $\frac{1}{2}$ to 1 in. long; carpels 12 to 18, tawny-tomentose; fruit-carpels numerous (7), tawny-tomentellous, obovoid-oblong, rather compressed laterally, gibbous, $\frac{2}{3}$ in. long, $\frac{1}{2}$ in. broad, $\frac{1}{3}$ in. thick, stipitate, 1-celled but with a partial septum from the base to near the top of the cell; stipes $\frac{1}{4}$ to $\frac{1}{3}$ in. long, tawny-tomentose. Seed solitary, elongated, bent in the middle through 180° over the partial septum of the fruit; albumen 0.

Golungo Alto.—In very dense and shady woods of Serra de Alta Queta, sparingly and usually solitary; Jan., March, and April 1856 in leaf without flower or fruit, fl. June 1856, with nearly ripe fruit August 1856. No. **2307.** Coll. Carp. 195.

In general appearance the specimens closely resemble *Triclisia macrophylla* Oliv. Fl. Trop. Afr. i. p. 48, a plant from Fernando-Po.

The genus of this plant is uncertain; perhaps it is a new type. *Chondodendron* differs by the filaments curved at the apex, and by the

apiculate connective in the male flower, as well as by the fewer (6) carpels in the female flower.

The following extract may refer to this species:—

Mucóco.—By this name the negroes of Hungo and of Alta Queta (a district of Golungo Alto and the country of the Mahungos) designate a robust creeper of this Order, which in habit much resembles the Abutua [*Tiliacora chrysobotrya* Welw.], but differs from Abutua in the shape of its leaves, which are cordiform, and by the ferruginous velvet with which its leaves and fruits are covered. The use which the negroes make of this plant, the root as well as the leaves and fruit, is exactly the same as of Abutua, although the latter is reputed by them to be more efficacious, which quality must be attributed to the greater proportion of resin which it contains in almost all its parts (Welw. Synopse p. 46).

4. **TRICLISIA** Benth. in Benth. & Hook. f. Gen. Pl. i. p. 39.

1. **T. (?) Welwitschii** Hiern, sp. n.

A scandent shrub usually decumbent over other shrubs; branches terete, pilose-hispid, twining towards the extremities; leaves ovate, obtuse or mucronate, broadly cordate at the base, thinly coriaceous, tending to rigidity, glabrescent above, with scattered pubescence beneath, entire, 5-7-nerved at the base, 3 to $3\frac{2}{3}$ by 2 to $2\frac{2}{3}$ in.; petiole patent, pilose-pubescent, $1\frac{1}{2}$ to $1\frac{3}{4}$ in., curved near the apex. Male plant unknown. Female flowers greenish, $\frac{1}{8}$ in. long, broad, on short or unequal pedicels, in axillary cymes scarcely as long as the petiole; sepals 12, obtuse, imbricate, hairy at the back; the 3 outermost very small and nearly equal, the next gradually larger; petals (innermost sepals?) 6, imbricate, small, obovate, glabrous on both surfaces but ciliate round the margin; stamens 0; carpels 4, substipitate, half-ovate, very densely pilose and surrounded by dense pilose hairs; style lateral at the apex, glabrous, erect; fruit unknown.

Pungo Andongo.—In very shady places of Mata do Pungo, very rare, only one individual found in flower. No. **2309.**

In consequence of the male flowers and fruit being unknown, the genus is doubtful; *T. subcordata* Oliv. Fl. Trop. Afr. i. p. 49, bears a general resemblance to this, but it differs by more numerous carpels as well as by other characters.

5. **SYNCLISIA** Benth. in Benth. & Hook. f. Gen. Pl. i. p. 36.

1. **S. scabrida** Oliv. ex Miers Contrib. iii. p. 371, t. 148 (1867); Oliv. Fl. Trop. Afr. i. p. 49.

Golungo Alto.—A climbing shrub or undershrub, with Menispermaceous habit, but also resembling *Dichapetalum*, and in the dry state suggesting *Diospyros Barteri* Hiern. Leaves opaque-green, dry, rigidly chartaceous. Exterior sepals of the male flowers 6, lanceolate, densely beset outside with elongated hairs; interior sepals 3, twice the length of the outer, thick-fleshy, almost coriaceous, united in a valvate manner into a cup 3-lobed at the apex, minutely but densely crisped-pilose near the united margins, otherwise glabrous. Stamens 9; filaments united at the base; anthers 2-celled; cells didymous, longitudinally dehiscing. A bundle of straight hairs in the centre of the filaments

far exceed the anthers. Petals very small, at the outer base of the filaments, 3 or 4; perhaps they are reduced filaments. In very dense and shady primitive woods of Serra de Alta Queta, one specimen in male flower-bud, Feb. 1856. No. **1272**. A twining little shrub, widely climbing, in flower-bud, Alta Queta, Jan. 1856, rather rare. No. **1272***b*. A scandent shrub, with slender stem, in woods of Queta, without flower or fruit, Oct. 1855. No. **1272***c*. A slender little shrub, widely but not highly climbing, stem 5 ft. high; a form with exactly cordate leaves, in very shady places of Serra de Alta Queta, sporadic, without fl. or fr. Oct. 1855. No. **1272***d*.

6. **CEBATHA** Forsk. Fl. Ægypt.-Arab. p. 171 (1775). *Cocculus* DC.; Benth. & Hook. f. Gen. Pl. i. p. 36.

1. **C. pendula** O. Kuntze, Rev. Gen. Pl. i. p. 9 (1891).

Cocculus Leœba DC. Syst. Veg. i. p. 529 (1818); Oliv. Fl. Trop. Afr. i. p. 44.

A climbing shrub; branches now and then twining, mostly deeply pendulous; drupes in the living state spherical, of the form and size of a small pea.

Cape de Verde Islands.—St. Jago, in thickets in the interior of the island, near Praia, etc., climbing on various trees, fl. and fr. Jan. 1861. No. **2320**.

2. **C. hirsuta** O. Kuntze, Rev. Gen. Pl. i. p. 9.

Cocculus villosus DC.; Oliv. Fl. Trop. Afr. i. p. 45.

Mossamedes.—A slender undershrub, at first decumbent with hastate angular leaves, soon widely scandent with ovate-elliptical leaves, twining; stems 3 to 6 ft. long; leaves all softly hairy; flowers greenish; petals bifid. In rocky places composed of red sandstone near Boca do Bero, not frequent, in young male flower in July 1859. No. **2315**.

Benguella.—A decumbent ascending little shrub, subscandent; petals bifid. In sandy stony thickets between the rivers Cavado and Cotumbella, in young male flower in June 1859. No. **2316**.

Bumbo.—Stem-leaves mostly angular-lobed. In high bushy places on a red clayey soil near Bruco, at the base of Serra da Xella, fl. and fr. Oct. 1859. No. **2319**.

7. **CISSAMPELOS** L.; Benth. & Hook. f. Gen. Pl. i. p. 37.

1. **C. Pareira** L. Sp. Pl. edit. 1, p. 1031 (1753); Oliv. Fl. Trop. Afr. i. p. 45.

A very variable plant, comprising, in the opinion of Miers, many distinct species.

Barra do Bengo.—An undershrub, 2 to 8 ft. long, widely climbing but not high, much twining; flowers pale yellowish green; drupes sparingly pilose. Frequent in palm groves and by crops of Euphorbiaceæ, etc., from Quifandongo to Barra do Bengo, fl. and fr. Dec. 1853. No. **2310**.

Golungo Alto.—An ashy green herb, 4 to 7 ft. long, much twining, dioœcious; male flowers yellowish; drupes scarlet, hirsute, globose, as big as a pea, 4-furrowed at the base; seed solitary, horseshoe-shaped, striate-rugose on the margin. Very frequent in exposed places at the margins of thickets, throughout the whole district, and flowering as

well as fruiting during nearly the whole year; heights of Camilungo Dec. 1854, Trombeta and Sange Sept. and Oct. 1855. No. **2311**. Coll. Carp. 198.

Pungo Andongo.—An elegant twining herb; root woody, persistent; leaves in the living state ashy-tomentose on both surfaces; flowers green. In rather dry exposed hilly places, investing small shrubs, between the fortress and Caghuy, in young flower Feb. 1857. No. **2317**.

Var. **deglabrescens** Welw. ms. Fruit quite glabrous; cotyledons oblong-linear, obtuse, cohering; albumen moderately copious, waxy, continuous. Bumbo.—Sporadic in thickets at the margins of woods of "Mutuate" (*Copaifera Mopane* Kirk), between Bumbo and Bruco; in female flower and fruit Oct. 1859. No. **2312**.

Var. **reniformis** Welw. ms. Leaves reniform. Huilla.—In rocky, sparingly bushy places between Lopollo and Ferraõ da Sola, sporadic, fl. Nov. and Dec. 1859. No. **2314**.

Var. **asperifolia** Welw. ms. Leaves somewhat peltate, rather rough. Golungo Alto.—Sporadic in the primitive woods of Quisucula, near streams in rather shaded places, in male flower Jan. 1855. No. **2313**.

Var. **owariensis** Oliv., *l.c.*, p. 46; *C. owariensis* Pal. de Beauv. ex DC. Prodr. i. p. 100 (1824). Cazengo.—A very slender, twining, dicœcious, ashy-green, widely climbing herb; drupe pilose, girt by an acute shortly winged margin. Rather rare by dense thickets at the skirts of woods along the banks of the streams Luze and Luinha, near their confluence at Muxaula; fl. and fr. Dec. 1854. No. **2318**.

8. **STEPHANIA** Lour.; Benth. & Hook. f. Gen. Pl. i. p. 37.

1. **S. rotunda** Lour. Fl. Cochinch. p. 608 (1790).

S. abyssinica Walp. Rep. i. p. 96 (1842); Oliv. Fl. Trop. Afr. i. p. 47.

A slender glabrous twining shrub, 10 to 15 ft. long, widely climbing, distantly branched; leaves 2 to 4 in. long and nearly as broad, peltate, broadly ovate, cuspidate or mucronate, rounded straight or slightly hollowed at the base, glaucous beneath, membranous but rather rigid; petiole 2 to 4 in.; flowers yellowish-green, in compound umbels; peduncle slender, $\frac{2}{3}$ to $2\frac{1}{2}$ in. long, subaxillary. Anthers 6 or 7, whitish; cells of all the anthers confluent; embryo horseshoe-shaped.

Huilla.—At the margins of woods near the lake Ivantala, climbing on species of *Acacia* and on *Brachystegia tamarindoides* (Welw. No. 585), in male flower and fruit in Feb. 1860. No. **2322**.

2. **S. lætificata** Benth. & Hook f. Gen. Pl. i. p. 962; Oliv. Fl. Trop. Afr. i. p. 47; var. **angolensis**.

Golungo Alto.—A sarmentose shrub, far and widely climbing, or a twining undershrub; stem slender, climbing to a great height, tortuous, rigid, elastic, beset as well as the petiole with long soft harmless hairs; leaves peltate, lamina perpendicularly pendulous; flowers dicœcious. Male flowers greenish (after the manner of an *Urtica*), in supra-axillary panicles; calyx 6-phyllous; segments obtuse, sub-concave, in two rows, the inner ones much longer than the outer; petals 3, rather convex, very obtuse, yellow-green, rather fleshy, much broader than the calyx-segments and as long. Stamens united into a column thickened at the

peltate apex; anthers 6, edging the peltate apex, transversely oblong, simulating a 6-lobed stigma, transversely dehiscing, almost quite contiguous or confluent. Sporadic in damp primitive woods at the banks of the river Delamboa and of the stream of Capopa; in male flower at the beginning of Dec. 1855. No. **2323**. At the borders of primitive woods about the base and in the elevated valleys of Cungulungulo; not yet in flower Feb. 1855. No. **2323***b*.

Cazengo.—A shrub with far and widely climbing, elongated, very tenacious, slender, flexuous stem, decking the neighbouring branches of trees with a dense crown; leaves large, peltate, of a pretty green colour; flowers yellow-greenish, bursting from the stem before the appearance of the leaves, very caducous; petioles with a rather fragile attachment at their insertion. Sporadic in the very dense primitive woods of Serra de Muxaũla, by streams; a young plant in leaf without flowers, and plants in flower but without leaves, Jan. 1855. No. **2325**.

Pungo Andongo.—A tall and widely climbing shrub, attaining 30 ft. in length; stems rope-like, and on that account frequently employed for cords, at least for a certain height, at the time of the flowering when the leaves are absent. Rather rare in the primitive woods of the fortress in the Mata do Pungo; in flower without leaves Jan. 1857. No. **2324**.

From the want of female flowers and fruit, the determination of the genus is uncertain.

3. **S. (?) cyanantha** Welw. ms. in Herb.

A slender, rather flexuous, bright green, glabrous shrub, parasitical on *Adansonia digitata* L., monœcious (?), branched from the base; branches rope-like, pendulous, 3 to 6 ft. long, with distant branchlets. At the base of the branches and also of the peduncles are thick cartilaginous orange-coloured semi-orbicular scales. Leaves deltoid-orbicular, or rarely reniform, usually pointed towards the apex, rounded below, peltate, glossy, glaucous beneath, chartaceous (in the dry state), entire repand or obsoletely angular, 2 to 3 by $1\frac{2}{3}$ to $2\frac{2}{3}$ in.; petiole slender, $1\frac{1}{2}$ to 2 in., inserted in the lamina about $\frac{1}{4}$ to $\frac{1}{3}$ part about the base of the latter. Male flowers numerous, small, deep-blue, arranged in small crowded hemispherical pseudo-umbellate lateral cymes of $\frac{1}{2}$ in. diam. on the leafless branches; common peduncle abbreviated; sepals 6, imbricate, broadly rounded; petals 3 or 5, shorter than the sepals, truncate, sometimes placed so near together as to form nearly a shallow cup, sometimes occurring only on one side of the flower; anthers 6 to 9, transversely dehiscing, sub-confluent, inserted in a peltate manner on a very short column. Ovary 0. Fruiting cymes similar, 1 to $1\frac{1}{4}$ in. diam. Female flowers unknown. Drupes (nearly ripe) reniform-orbicular or sub-reniform, $\frac{1}{6}$ to $\frac{1}{5}$ in. diam., somewhat compressed, greenish, 1-celled, 1-seeded; seed reniform or somewhat horseshoe-shaped; albumen scarcely any or thinly mucilaginous; cotyledons of the same shape as the seed, flat, obliquely obovate, very tender; radicle short.

Pungo Andongo.—Parasitical on old branches of *Adansonia*, near Calunda, within the fortress, but very rarely met with; leafy branches in fruit in Jan. 1857, and leafless branches in male flower on the same *Adansonia* in May 1857. No. **2321**.

9. **EPINETRUM** Hiern, gen. nov.

Diœcious. Male flowers axillary, about 3 together, clustered, subsessile, bracteate. Outer sepals 6, ovate, puberulous, imbricate, all small and gradually smaller outwards down to the similar bracteole; inner sepals 3, connate into a shortly trifid valvate cup, crass, glabrate, 2 or 3 times as high as the outer sepals, lobes ovate obtuse. Petals 6 or fewer or obsolete, very short, some or all truncate and imbricate, glabrous. Stamens glabrous, united into a thick firm 6-ribbed column, which is thicker and antheriferous in several (6 vertical) rows near and at the apex; anthers 18 (or more?), sessile; cells 2, extrorse, transversely dehiscing, at length confluent, ovary 0.

The female plant is unknown: therefore the precise position of this genus in the Family must for the present remain uncertain, but the peculiar androœcium serves to characterise the genus; it appears to be intermediate between the genus *Synclisia* Benth. and the tribe Cissampelideæ.

1. **E. undulatum** Hiern, sp. unica.

A slender climbing shrub; stems terete, tortuous, twining; branches pendulous; the branchlets and petioles shortly tawny-pubescent. Leaves entire, alternate, oval, obtusely sub-acuminate, mucronate, rounded at the base, coriaceous, glossy, glabrous except the puberulous midrib, penninerved, $1\frac{1}{2}$ to $2\frac{2}{3}$ by $\frac{3}{4}$ to $1\frac{1}{3}$ in.; margins rather incrassate-revolute, quite entire, wavy with small undulations; lateral veins slender, alternate, 5 or 6 on each side of the midrib, inconspicuous on the upper surface; petiole $\frac{1}{4}$ to $\frac{1}{2}$ in., usually bent and thickened near the apex. Male flower-buds about $\frac{1}{6}$ in. long.

Pungo Andongo.—Very sparingly in stony densely bushy primitive woods, in Mata de Pungo, in leaf and few male flowers, May 1857. No. 477.

V. NYMPHÆACEÆ.

The species of this Order, and especially *Nymphæa dentata* Schum. & Thonn., constitute the wonder of the great lakes of the coast region, which are very often entirely covered with this fine and very beautiful water-lily. The tuberculose rhizomes of the species are edible, with the flavour of chestnuts, and are much sought after by the natives.

1. **BRASENIA** Schreb.; Benth. & Hook. f. Gen. Pl. i. p. 46.

1. **B. peltata** Pursh, Fl. Amer. Sept. ii. p. 389 (1814); Oliv. Fl. Trop. Afr. i. p. 52.

B. africana Welw. (*Barteria*) in Archiv. Sc. Phys. et Nat., Jul. 1861, p. 8. *B. purpurea* Caspary in Jorn. Sc. Lisb. iv. p. 312 (1873). *Cabombacea*, Welw. in Journ. Linn. Soc. v. p. 186 (1861).

The stems in deep water attain 18 ft. in length. It recalls *Limnanthemum nymphoides* by its leaves, and by its flowers *Butomus umbellatus* L.

Huilla.—Frequent and in company with *Nymphæa stellata* Willd., species of *Utricularia*, etc., between Lopollo and Quilengues, in the great inland lake called Ivantâla, gathered in flight, with flower and fruit, in the beginning of March 1860. No. **1178**.

Welwitsch (Sertum Angolense, p. 36), remarks on this North American plant occurring in the interior of Angola, for although he searched a great number of lakes in the region of the coast, yet it was only in this lake, situated more than 120 geographical miles from the Atlantic Ocean, and at an elevation of about 5000 ft., that he found it.

2. **NYMPHÆA** Tournf., L.; Benth. & Hook. f. Gen. Pl. i. p. 46.

1. **N. Lotus** L. Sp. Pl., edit. 1, p. 511 (1753); Welw. Apont. p. 592, n. 115; Oliv. Fl. Trop. Afr. i. p. 52; Caspary in Jorn. Sc. Lisb. iv. p. 321 (1873).

The Angolan specimens belong to Caspary's division II. **angusta**, and of this division he makes two sections, as under: he has printed most of Welwitsch's notes.

a. glabrescens.—Our specimens belong to Caspary's subsection *b. acuminiloba*, leaves shortly elliptical, glabrous, lobes prolonged-acuminate, overlapping.

Mossamedes.—Frequent in lakes at the mouths of the river Giraul (in Maiombo); fl. and fr. July 1859. No. **1169**.

b. dentata.—*N. dentata* Schum. & Thonn., Beskr. Guin. Pl. p. 249 (1827); Welw. Apont. p. 555; Welw. in Proc. Linn. Soc. ii. p. 328 (1855). Leaves more or less pubescent beneath, not glabrous, as stated by Schumacher and Thonning, *l.c.*

Ambriz.—Frequent in deep pools and lakes, Quizembo and Banza de Ambriz; fl. Nov. 1853. No. **1164**.

Icolo e Bengo.—Lagôa de Quilunda, fl. 14 Sept. 1854. No. **1168**. Coll. Carp. 199. In the large lake Lagôa de Quitundo. Seeds, June 1857 and July 1860, in company with *Pistia*, etc. Coll. Carp. 130.

Ambaca.—In a small lake near the left bank of the river Caringa, between Dalatanda and Ambaca, in company with *Ottelia*, June 1855. No. **1166**.

Pungo Andongo.—Common in the river Quije, in company with *Nymphæa stellata* Willd., *Ceratophyllum*, and *Azolla*, fl. March 1857. No. **1165**.

Barra do Dande.—In lakes near the banks of the river Dande; radical tubers collected Sept. 1858: see Welwitsch, Apont. p. 592, n. 115. The most beautiful of all species of the genus, with leaves a foot in diameter and even larger, and with very large violet-purplish flowers. Eaten by the negroes. Coll. Carp. 200.

The lakes, especially the smaller ones, are often so completely covered with *N. dentata*, sometimes in company with *Pistia*, that it is impossible to see the surface of the water. In the Lagôa de Quilunda, *N. Lotus*, which grows there in company with Lemnaceæ, especially *Lemna arrhiza* L. and *Pistia*, in enormous quantities, is heaped up by the negroes on the banks, to serve as manure.

2. **N. malabarica** Poir. in Lam. Encycl. Méth. iv. p. 457 (1797). *N. stellata* Willd. Sp. Pl. ii. p. 1153 (1799); Oliv. Fl. Trop. Afr. i. p. 52; Caspary, Nymphææ Angol. p. 5 in Jorn. Sc. Lisb. No. xvi. (1873), cum syn.; non? F. Muell. *N. ampla*, Kotschy

Hb. Nub. n. 167. *N. nubica*, J. G. C. Lehm. in Otto Hamb. Gart. Zeit. ix. p. 211 (1853). *N. discolor*, J. G. C. Lehm., *l.c.*, p. 214. *N. pseudo-pygmæa*, J. G. C. Lehm., *l.c.*, p. 208. *N. cærulea* and *N. micrantha* Welw. in Proc. Linn. Soc. ii. p. 328 (1855). *N. zanzibariensis* Caspary in Bot. Zeit. 1877, p. 201.

Dr. Welwitsch's specimens are as under; for their arrangement in accordance with Caspary's highly differentiated dissection of this comprehensive species, the paper in the Lisbon journal quoted above can be consulted, in which paper Welwitsch's notes are mostly included.

Ambriz.—Lagôa de Quizembo, fl. and fr. Nov. 1853. No. **1170**.

Barra do Bengo.—Lagôa de Quifandongo, fl. end of Dec. 1853 and beginning of Jan. 1854. No. **1171**.

Icolo e Bengo.—Lagôa de Quilunda, leaves shortly after germination, Sept. 1854, No. **1172**; sparingly in pools and in marshy places nearly terrestrial, near Funda (no specimen separated for the British Museum), Jan. 1854. No. **1173**.

Ambaca.—In a lake near the left bank of the river Caringa, fl. June 1855. No. **1167**. A form with smaller flowers and leaves is mentioned by Caspary, Nymph., *l.c.*, p. 13, under No. **1167***b*.

Pungo Andongo.—Not frequent, and in company with *Ottelia*, in the deeper elevated pools of the fortress, fl. middle of Feb. 1857. No. **1175**. In the river at Quije, fl. March 1857 (no specimens separated for the British Museum). Nos. **1175***b*, **1185**.

Huilla.—In deep pools by the side of the river of Lopollo, fl. Jan. 1860. No. **1176***b*. In the river Quipumpunhime, between Humpata and Ohay, also near Lopollo; flowers very fragrant, Feb. 1860. No. **1176**. In great plenty in the large lake Ivantala, between Quilengues and Lopollo, in flower beginning of March 1860. No. **1177**. In the deeper slowly-flowing streams between Catumba and Ohay, fl. middle of May 1860. No. **1174**.

VI. PAPAVERACEÆ.

Papaver somniferum L. Sp. Pl. edit. 1, p. 508 (1753), occurs at Loanda only in gardens (Welw. ms.).

1. **ARGEMONE** L.; Benth. & Hook. f. Gen. Pl. i. p. 52.

1. **A. mexicana** L. Sp. Pl. edit. 1, p. 508 (1753); Oliv. Fl. Trop. Afr. i. p. 54.

Cape de Verde Islands.—St. Jago, on rubbish heaps; fl. Jan. 1860. No. **1200**.

Sierra Leone.—At Freetown, common in rubbish heaps; fr. Sept. 1853; a single specimen. No. **1201**.

VII. FUMARIACEÆ.

1. **FUMARIA** L.; Benth. & Hook f. Gen. Pl. i. p. 56.

1. **F. capreolata** (?) L. Sp. Pl. edit. 1, p. 508 (1753); a weak form.

Loanda.—In gardens, spontaneous but certainly introduced with living plants of *Vitis vinifera* L., introduced from Benguella and originally from Portugal; in young flower Nov. 1858. No. **1199**.

VIII. CRUCIFERÆ.

The Cruciferæ are represented in Angola proper by hardly more than three indigenous species, namely, by two species of *Nasturtium* in the coast region, and by a *Cardamine* in the cultivated fields of Golungo Alto. In Huilla only one species was seen, a *Lepidium*. The cauliflower, the cabbage, the turnip, radishes, and watercress are cultivated in gardens at Loanda, and in the *arimos* of the neighbouring districts; a species of mustard is cultivated in the hilly and highland regions of Angola proper; the cabbages of Benguella are gigantic (Welw. Apont. p. 554).

1. **NASTURTIUM** Br.; Benth. & Hook. f. Gen. Pl. i. p. 68.

1. **N. officinale** Br. in Ait. Hort. Kew. edit. 2, iv. p. 110 (1812); Oliv. Fl. Trop. Afr. i. p. 58.

Golungo Alto.—Common and almost everywhere at the margins of slowly flowing streams, spontaneous, especially near Sange and Bango, and at the banks of the river Quiapoze; not yet in flower May 1855. No. **1192**.

Ambaca.—In great plenty, as it were covering the streams along considerable tracts, in the marshy meadows between Puri-Cacarambola and N-gombe; fl. and fr. Oct. 1856. No. **1193**.

Indigenous or more probably introduced long ago. Welwitsch in his manuscripts states that it occurred in one spot near Lopollo in the district of Huilla, but there is no specimen in his herbarium.

2. **N. indicum** DC. Syst. Veg. ii. p. 199 (1821); Oliv. Fl. Trop. Afr. i. p. 58.

Barra do Bengo.—Root annual and perennial, sometimes stiffly twisted. In nearly dry pools near the banks of the river Bengo, especially near Panda; fl. and fr. Dec. 1853. No. **1194**.

Icolo e Bengo. Not unfrequent around the nearly dry lake of Quilunda, near Prata; fl. and fr. Sept. 1854. No. **1188**.

Barra do Dande.—Flowers yellow. Frequent in marshy places at the right bank of the river Dande, near Bombo; fl. and fr. Sept. 1858. No. **1187**. Annual or biennial, $1\frac{1}{2}$ to $2\frac{1}{2}$ ft. high, formed like a *Barbarea*, at the margins of lakes near the river Dande, by Bombo: fruits Sept. 1858. Coll. Carp. 201.

Loanda.—At the margins of stagnant pools, between Quicûxe and Mutollo; not yet in full flower July 1854. No. **1187***b*.

3. **N. humifusum** Guill. & Perr. Fl. Senegamb. p. 19 (1830-31); Oliv. Fl. Trop. Afr. i. p. 58.

N. (Clandestinaria) *acaule*, Welw. Apont. p. 589, n. 68.

A stemless annual herb, with the habit of *Cardamine*. Leaves radical, rosulate, spreading like a star, pinnatisect. Peduncles radical, crowded, decumbent, quite leafless, slender. Flowers racemose, greenish-white, very small, very shortly pedicelled. Calyx-segments equal, concave, muricate at the back with 2 or 3 hyaline rather elongated acute spreading spines, soon deciduous. Petals usually 2, linear-spathulate, shorter than the 6 toothless stamens. Hypogynous glands 4 or 2, setuliform or sub-alate. Style short, thick; stigma discoid, undivided. Siliqua $\frac{1}{3}$ in. long,

spreading, inconspicuously torulose, rigid; valves very concave, without nerves. Seeds numerous, of a deep orange colour, subpendulous, oblong-cordiform, vaguely biseriate in each cell, minutely punctate in relief.

Loanda.—Around drying pools near Quicuxe, plentifully but only observed in one spot; fl. and fr. 29 July and 5 August 1858. No. **1197**. Coll. Carp. 202.

Libongo.—At the sandy banks of the river Lifune, between Banza de Libongo and the petroleum mines, rare; fr. Sept. 1858. No. **1198**.

2. **CARDAMINE** L.; Benth. & Hook. f. Gen. Pl. i. p. 70.

1. **C. trichocarpa** Hochst. ex A. Rich. Fl. Abyss. i. p. 18 (1847); Oliv. Fl. Trop. Afr. i. p. 60.

An annual herb, 5 to 15 in. high, with the habit of *Cardamine sylvatica* Link or *C. hirsuta* L., wholly beset, sometimes sparingly sometimes abundantly, with soft whitish pilose hairs. Stem ascending or rarely erect, acutely angular by the decurrence of the petioles. Calyx-segments purplish (violet), hispidulous with rather long white hairs, erect, concave, equal at the base, inflected at the margin and apex. Corolla 0. Stamens 4, all of equal height, alternating with the calyx-segments. Style thick; stigma depresso-capitate, almost patelliform, nearly flat at the margin, slightly fimbriate. Siliquas glabrate.

Golungo Alto.—Common in rather damp cultivated fields, at the margins of streams; at the banks of the river Cuango, near Canguerasange; fl. and fr. Sept. and Dec. 1854, Jan. 1855. No. **1189**. Coll. Carp. 203.

The type of the species occurs in Abyssinia; it may possibly prove to be a variety of *Cardamine hirsuta* L.

3. **BRASSICA** Tourn., L.; Benth. & Hook. f. Gen. Pl. i. p. 84.

1. **B. Willdenovii** Boiss. in Ann. Sc. Nat. ser. 2, ii. p. 88 (1842). *B. juncea* Hook. f. & Thoms. in Journ. Linn. Soc. v. p. 170 (1861); Oliv. Fl. Trop. Afr. i. p. 65.

Used by the natives in Angola as a pot-herb, but not cultivated for its oil there.

Golungo Alto.—Spontaneous, but no doubt originally introduced, about Banza de Quilombo-Quiacatubia and near Bango-Aquitamba, common; fl. and fr. Feb. 1855. No. **1186**. An escape from cultivation and also cultivated in Sobato Bango, etc., Quibolo; fl. and fr. middle of August 1856. No. **1186***b*. On the road to Ambaca, in dry sparsely grassy places, apparently a biennial herb with almost woody root and yellowish flowers; fl. and fr. beginning of March 1856. No. **1186***c*.

4. **LEPIDIUM** L.; Benth. & Hook. f. Gen. Pl. i. p. 87.

1. **L. ruderale** L. Sp. Pl. edit. 1, p. 645 (1753); Oliv. Fl. Trop. Afr. i. p. 69; var. **aethiopicum** (*L. aethiopicum* Welw. ms. in Herb.).

A herb, biennial or persisting for several years, with the habit of an *Alyssum*; root woody, perhaps perennial; rhizome polycephalous; stems numerous, prostrate-ascending, leafy, puberulous;

leaves narrowly oblanceolate-cuneate, attenuate at the base, petiolate, acutely and distantly dentate towards the apex, hispid with whitish hairs, ranging up to $\frac{1}{2}$ in. long inclusive of the petiole; flowers very small, greenish or greenish-yellow, in elongated terminal ebracteate racemes. Stamens 2. Pod elliptical, retuse at the apex, rounded at the base, $\frac{1}{8}$ in. long; style very short; valves boat-shaped, keeled, not winged; seeds pendulous, solitary in each cell, rather obovoid, rather compressed, reddish, septum lanceolate, or narrowly oval, narrowed at both ends, white, membranous. Pedicels scarcely as long as the pods. Cotyledons incumbent.

Huilla.—Not uncommon, in hot, rather dry fields, between Humpata and Serra de Uiahoia, at an elevation of about 5000 ft., late fl. and fr. 23 April 1860. No. **1190**. Coll. Carp. 66.

This is the only Crucifer collected by Welwitsch in the district of Huilla, where not even watercress was seen.

2. **L. virginicum** L. Sp. Pl. edit. 1, p. 645 (1753).

Madeira.—In dampish stony places, by the road leading from Funchal towards Camara dos Lobos, fl. and fr. August 1853. No. **1191**.

5. **ISATIS** L.; Benth. & Hook. f. Gen. Pl. i. p. 94.

1. **I. tinctoria** L. Sp. Pl. edit. 1, p. 670 (1753).

Madeira.—Cæspitose and suffruticose. In gravelly places, between Funchal and Camara dos Lobos, not far from the ocean, fl. and fr. end of August 1853. No. **1196**.

6. **RAPHANUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 101.

1. **R. sativus** L. Sp. Pl. edit. 1, p. 669 (1753); Oliv. Fl. Trop. Afr. i. p. 73.

Golungo Alto.—An escape from cultivation, occasionally spontaneous: by the sandy banks of the rivers Delamboa and Quiapoza, fl. and fr. March 1856. No. **1195**.

IX. CAPPARIDACEÆ.

Members of this Order are abundant in the littoral and hilly districts of Angola; one species, *Gynandropsis pentaphylla* DC., is cooked and eaten as greens; the bark of the root of another species, called "Suna" by the negroes, is employed by them as a caustic and sudorific; and a species of *Capparis* furnishes excellent capers.

1. **CLEOME** L.; Benth. & Hook. f. Gen. Pl. i. p. 105.

1. **C. monophylla** L. Sp. Pl. edit. 1, p. 672 (1753); Oliv. Fl. Trop. Afr. i. p. 56.

Golungo Alto.—In cultivated fields, especially in those of *Phaseolus* and *Arachis hypogæa* L., near Sange, not uncommon; fl. and fr. Jan. and May 1855. No. **947**. A slender herb, 2 to 3 ft. high, patently branched; leaves lanceolate; flowers of a deep-violet colour; in hot situations near Canguerasange, Oct. 1854. Coll. Carp. 204.

Pungo Andongo.—In fields planted with *Zea Mays* L. behind the fortress, occasional; fl. and fr. Feb. 1857. No. **948**.

It occurs also in dry sandy meadows, and, but not abundantly, in moist pastures.

2. **C. ciliata** Schum. & Thonn. Beskr. Guin. Pl. p. 294 (1827); Oliv. Fl. Trop. Afr. i. p. 78.

C. guineensis Hook. fil. in Hook. Niger Fl., p. 218 (1849).

Very variable in the size and breadth of the leaflets.

Loanda.—An annual herb; stems 1 to 4 ft. high, prostrate-ascending, acutely or almost alate-angular; leaves constantly trifoliolate, lower petioles long; petals of a deep violet colour, very common in very dry as well as in moist fields throughout the district; Quicuxe, Teba, etc., fl. and fr. 7 March 1858, June 1858, March 1854. No. **955**.

Golungo Alto.—Not uncommon in fields about Sange and Camilungo, fl. and fr. March 1855. No. **956**.

Pungo Andongo.—Leaves 3- or 5-foliolate; corolla deep violet or purple. Not uncommon in sandy and in exposed shortly-grassy places between Pungo Andongo and Sansamanda, fl. and fr. March and April 1857. No. **951**.

Huilla.—A slender annual, from a few inches to a foot high; primary stem straight, branches a little hairy, the lower ones ascending; flowers whitish-lilac, rather small; buds purple; capsules deflexed, mucronate, strigulose with whitish glandular papillæ; in sandy dampish pastures between Morro de Lopollo and Humpata, not frequent, fl. and fr. end of Feb. and 21 March 1860. No. **957**. In sparingly grassy pastures near Lopollo, in the direction of Catumba, fl. and fr. Dec. 1859. No. **957***b*. An annual herb, 3 to 4 ft. high, with violet flowers. In bushy places and in previously cultivated places near Lopollo; fr. March 1860. Coll. Carp. 85.

3. **C. diandra** Burch. Travels i. p. 548 (1822), Cat. Geogr. n. 2103; Oliv. Fl. Trop. Afr. i. p. 79.

Mossamedes.—A suffrutescent herb, becoming woody at the base; stem and leaves very thin; leaflets 5 to 9, highly glaucous; flowers yellow to golden-tawny; rather uncommon, in sandy places at the banks of the river Bero, near Cavalheiros, fl. and fr. June 1859. No. **962**.

Var. **pteropoda** (Welw.) ex Oliv., *l.c.*, p. 80. This variety is regarded by Oliver as a maritime condition of the type; it is distinguished by its winged petiole and broader pods, and according to Welwitsch the seeds are more densely furnished with little echinate spines.

Mossamedes.—An annual or biennial herb, erect, 2 to 3 ft. high, highly glaucous; flowers yellow; petioles alate-dilated. Sparingly in maritime sandy places, Cape Negro, between S. Joaõ do Croque (Caroca) and Cazimba, fl. and fr. Sept. 1859. No. **963**. Branched from the base, very glaucous, apparently perennial; leaves 7 to 9, very narrow; flowers rather large, yellow. At Cabo Negro, in sandy places, fr. 3 Sept. 1859. Coll. Carp. 205.

The following is doubtfully referred to the same species; Welwitsch suggested that it belongs to the variety *pteropoda* :—

Libongo.—A perennial herb; root woody, many-headed; stem erect, branches; leaves on long petioles, patently 5-foliolate; leaflets linear, very narrow, glaucous. Not unfrequent in dry elevated mountainous places of Sob. de Libongo, near the petroleum-mine, without flowers or fruit Sept. 1858. No. **964**.

4. **C. Iberidella** Welw. ex Oliv. Fl. Trop. Afr. i. p. 79.

Pungo Andongo.—In great quantity in sandy rocky places by the banks of the river Cuanza, between Calunda and Candumba, fl. and fr. Jan. 1857. No. **949**.

5. **C. foliosa** Hook. fil. in Hook. Niger Fl. p. 219 (1849); Oliv. Fl. Trop. Afr. i. p. 80.

Benguella.—A suffruticose herb, annual? or lasting for several years, becoming woody at the base; stem prostrate, branched from the base; branches oblique, elongated, virgate, leafy; leaves 3-5-foliolate, viscid-hairy; flowers yellow-tawny; stamens 10 to 20; pod stipitate. In sandy maritime stations to the south of the city of Benguella, frequent, fl. and fr. June 1859. No. **965**. An annual or biennial shrubby herb, with trifoliolate leaves and yellow flowers; in sandy situations along the coast near the city of Benguella, fr. June 1859. Coll. Carp. 207.

Mossamedes.—Polymorphous in habit and in the shape of the leaves, always more or less viscid; common throughout the district in dry and also in damp maritime sands, fl. and fr. June and July 1859. No. **966**. Rather scarce in maritime sands near the river Giraul to the north of the town of Mossamedes, with yellow flowers and young fruit July 1859. No. **967**.

6. **C. hirta** Oliv. Fl. Trop. Afr. i. p. 81.

Benguella.—An annual suffrutescent much-branched herb, with linear viscid leaflets and violet-purple very elegant yellow flowers variegated with yellow. Frequent in maritime bushy sandy places near the city of Benguella, fl. and fr. June 1859. No. **954**. An annual diffusely branched herb, with narrow leaflets and deep-yellow flowers, but with two petals purple; on the sandy coast near the city of Benguella, fr. June 1859. Coll. Carp. 206.

Bumbo.—Sparingly in fields after the cultivation of *Arachis hypogæa* L., near Bumbo, fl. and fr. Oct. 1859. No. **950***b*.

Huilla.—Occasional and gregarious, in neglected fields after crops of *Sorghum*, between Lopollo and Monino, fl. and fr. Jan. 1860. No. **950**. In neglected fields between Nene and Humpata, with deep-violet flowers and few fruits, Dec. 1859. No. **952**.

Mossamedes.—Annual, branched from the base; branches rather spreading; flowers rather large, beautifully whitish-yellow, variegated with saffron and purple. Rather rare in sandy sparingly grassy places by the banks of the river Bero, fl. and fr. beginning of August 1859. No. **953**.

2. **GYNANDROPSIS** DC.; Benth. & Hook. f. Gen. Pl. i. p. 106.

1. **G. pentaphylla** DC. Prodr. i. p. 238 (1824); Oliv. Fl. Trop. Afr. i. p. 82 (*Cleome*); Welw. Apont. p. 586, n. 26.

Cleome rosea Eckl. Coll. Sem. 1833, non Vahl nec Poit. *C. Eckloniana* Schrad. Ind. Sem. Gott. 1834, p. 2, and in Linnæa x. Litt. p. 109 (1836). *C.* (*Gynandropsis*) *oleracea* Welw. Apont. p. 555, under n. 120, and p. 586, n. 26.

Lower leaves 5-7-foliolate.

Sierra Leone.—A glaucescent herb, in exposed places near Freetown; fl. and fr. Sept. 1853. No. **961**.

Loanda.—Called by the negroes "Mozêmbue" or "Mozambue." In the interior of the country found only in places where the negro caravans touch; very common in sandy and clayey places, whether damp or rather dry, after the spring and summer rains in the neighbourhood of Loanda and in the city itself; fl. and fr. Oct. and Nov. 1853 and Feb. 1854. No. **958**. A form with the lower leaves 6-foliolate, Loanda, fl. and fr. March 1854. No. **958***b*. An annual herb, 2 ft. high; flowers white-violet. Eaten by the negroes like spinach. In sandy places throughout the district, Dec. 1857 and March 1858. Coll. Carp. 163.

Golungo Alto.—Native name "Mozâmbue." A herb eaten by the negroes. Frequent in exposed uncultivated places about Banza de Quilombo Quiacatubia, fl. and fr. Feb. 1855. No. **959**.

Pungo Andongo.—See Welw. Apont. p. 586, n. 26; no specimens in Herb.

Huilla.—In neglected fields and behind dwellings, sporadic, fl. and fr. Dec. 1859. No. **960**.

Welwitsch found it also near Luinha, in the district of Cazengo.

3. **MÆRUA** Forsk.; Benth. & Hook. f. Gen. Pl. i. p. 108.

1. **M. angolensis** DC. Prodr. i. p. 254 (1824); Welw. in Proc. Linn. Soc. ii. p. 329 (1855); Welw. Apont. p. 555; Welw. Synopse p. 15; Welw. in Journ. Linn. Soc. ix. p. 288; Oliv. Fl. Trop. Afr. i. p. 86.

Very variable in habit and in the shape of the leaves; it occurs in dry and rocky situations in the coast regions from Ambriz to Benguella; occasionally it becomes a tree, although usually it assumes the form of a bush; it is known by the name of "Muriangombe."

Loanda.—A tree 15 to 20 ft. high, with a straight trunk 6 to 8 in. in diameter; near Gabriel's house, fl. 1 April 1854; commonly only a shrub; fl. May and June 1858; in dry clay-sandy hilly stations, almost everywhere about Loanda up to the mouth of the river Coanza. No. **968**. In the interior a tree of 25 to 30 spans high, but in the littoral regions a shrub of 4 to 5 ft.; abundant. At Mutollo, fr. 23 July 1854. Coll. Carp. 99. In flat places on the hills near Loanda; fr. August 1860. Coll. Carp. 124.

Bumbo.—An arborescent shrub, with rambling branches and green-subglaucescent leaves, in thickets at the edges of primitive forests near Bumbo, sporadic; sparingly fl. and fr. Oct. 1859. No. **969**.

Var. β. **heterophylla** (Welw.), ex. Oliv., *l.c.* Loanda.—A shrub, 3 to 4 ft. high, very smooth; flowers grass-green; in dry thickets between Loanda and Cacuaco, rather rare; sparingly in fl. near Museque de Senhor Schut, 2 Nov. 1853. No. **968***b*.

Var. γ. **stenophylla** Welw. ms. in Herb. Loanda.—Branches more or less rod-like, sprung up from the base of burnt or fallen trunks, never seen in flower; on dry hot sandy-rocky hills, near Alto das Cruzes, June 1858. No. **968***c*.

Var. δ. **platyphylla**. Loanda.—Leaves oval, $2\frac{1}{2}$ in. long by $1\frac{3}{8}$ in. broad. No. **968***d*. Welwitsch, Apont. 555, describes it as forming a small very handsome tree, which agreeably interrupts the gloomy uniformity of the neighbourhood of Loanda; during all his travels he found it only three or four times developed as a full-grown tree (Journ. Linn. Soc. ix. p. 288).

The following perhaps belongs here, at least if *M. senegalensis* Br. is correctly united with *M. angolensis* D.C.; it is the *Mærua* of Welwitsch referred to by Oliver, *l.c.*, p. 87, under *M. Currori* Hook. f. :—

Benguella.—A shrub of a man's height; stems erect, much and patently branched; leaves glaucous, rather fleshy; fruit cylindrical, multiform, torulose; outer covering of the seeds brilliantly scarlet. Not uncommon in sandy thickets between the city of Benguella and the river Catumbella; in very advanced fruit June 1859. No. **977**.

2. **M. crassifolia** Forsk. Fl. Ægypt.-Arab. p. cxiii (1775); Oliv. Fl. Trop. Afr. i. p. 87.

M. uniflora Vahl Symb. i. p. 36 (1790); Oliv., *l.c.*, p. 86. *M. rigida* Br. in Denh. & Clapp. Trav., App., p. 226 (1826); DC. Prodr. i. p. 254; Oliv., *l.c.*, p. 86.

Var. **buxifolia** (Welw.) *M. rigida* Br., var. *buxifolia* Oliv., *l.c.* Mossamedes.—A slender shrub, 3 to 4 ft. high, with whitish flowers. In rough, sparingly bushy, mountainous situations, at the banks of the river Maiombo, near Cazimba; fl. and fr. Oct. 1859. No. **975**.

Var. **virgata** (Welw.). *M. rigida* Br., var. *virgata* Oliv., *l.c.* Mossamedes.—A divaricately branched, rigid, fragile shrub, 3 to 5 ft. high; flowers white-greenish. In dry, rough, mountainous situations near Cazimba, along the road leading to Pomangala; fl. Oct. 1859. No. **976**.

The following four numbers, the first two specimens with not quite glabrous fruits, appear to belong to this species :—

Mossamedes.—A bush, 15 ft. high or smaller, with glaucous rather fleshy leaves; on the sandy heath of Cacimba, near the river Maiombo, fr. June 1860. Coll. Carp. 208. A bush of 10 to 12 ft., in Serra de Cacimba, near Maiombo, rather scarce; fr. Oct. 1859. Coll. Carp. 945. A shrub, 5 to 8 ft. high, with many stems and densely branched; on the red-sandy banks at the mouth of the river Bero, without flowers or fruit July 1859. No. **979**. A shrub, 3 to 4 ft. high, much branched in various directions, somewhat spinous, with the habit of a *Lycium* and rather fleshy glaucous foliage; same locality and date. No. **6023**.

The following is very doubtfully placed here :—

Benguella.—A glabrous rather glaucous not spinous shrub, as tall as a man; branches virgate, with the habit of *Rosmarinus*, terete, leafy; leaves crowded in little clusters on slight elevations on the branches, narrowly linear-spathulate, shortly petiolate, apiculate or obtuse, ranging up to $1\frac{1}{4}$ in. long, rigid, coriaceous; lateral veins obsolete. In low open sandy woods between Benguella and the river Catumbella, without flowers June 1859. No. **984**.

4. **BOSCIA** Lam.; Benth. & Hook. f. Gen. Pl. i. p. 108.

1. **B. Welwitschii** Gilg in Notizbl. Bot. Gart. Berlin, i. p. 109 (26 Nov. 1895).

B. angustifolia Oliv. Fl. Trop. Afr. i. p. 92; nec A. Rich. nec Harv.

Bumbo.—A robust shrub, branched from the base, 5 to 8 ft. high, very pleasing and full of flower. In thickets of primitive woods at

the base of Serra da Xella, at a place called Bruco, fl. and young fruit Oct. 1859. No. **980**.

The following may, as suggested by Welwitsch, belong here :—

Mossamedes.—A very rigid sparingly branched shrub, 4 ft. high. In dry mountainous places at the right bank of the river Maiombo near Cazimba, without flower or fruit June 1860. No. **981**.

2. **B. salicifolia** Oliv. Fl. Trop. i. p. 93.

Mossamedes.—A distorted decumbent shrub, much branched from the base ; flowers greenish-white. Sporadic, in dry sandy stony places, between Mata dos Carpinteiros and Páo, fl. June 1860. No. **982**.

3. **B. microphylla** Oliv. Fl. Trop. Afr. i. p. 93.

Bumbo.—A small tree, 8 to 12 ft. high, with the habit of *Elæagnus* or *Hippophaë* ; trunk straight ; crown much branched ; branchlets often spinous ; flowers yellowish. In rough mountainous places, by the banks of the river Maiombo, between Pomangala and Quitive ; in one place only found plentifully, in company with *Balanites* and species of *Acacia*, sparingly in flower Oct. 1859. No. **983**.

4. **B. urens** Welw. ex Oliv. Fl. Trop. Afr. i. p. 93.

Loanda.—In the littoral region a cultivated shrub of 2 to 4 ft., and in the hilly (or interior-littoral) region, as for example near Quicanga, a small tree of 10 or rarely 12 ft. Wood fine-grained, yellowish-white, and shining like satin ; branches patulous-erect, the ultimate ones virgately elongated ; leaves evergreen dryly coriaceous ; flowers greenish, apetalous ; buds spherical or obovate-globose ; calyx tetramerous, valvate in æstivation ; stamens numerous, 14 to 20, usually 16, inserted around the pistil within a thick spongy disk ; filaments ascending, all of the same height, clavate-thickened upwards or now and then uniformly cylindrical ; anthers oblong, sagittate-cordate, introrse, 2-celled ; ovary stipitate, ovate-pyramidal, many-ovuled, surmounted by a globose-capitate stigma ; fruit spherical, as large as a cherry in the littoral region or in the hilly region as a small-sized walnut, hard and tomentose when young, but when fully ripe softly crustaceous and outside very densely clothed with hyaline smartly stinging setulæ, quite pale yellowish, bursting irregularly ; seeds 2 to 5, pretty large, more or less uniform, nestled in a completely dried pulp. Very common in the drier thickets from Loanda towards Tanderachique ; rarer and as a small tree in the more elevated regions around Quicanda ; flowering from March to May and June and not uncommonly again in September ; in young fruit in July 1854 ; Museque do Sr. Schut 17 May 1854. No. **989**. Coll. Carp. 209.

5. **CAPPARIS L.** ; Benth. & Hook. f. Gen. Pl. i. p. 108.

1. **C. tomentosa** Lam. Encycl. Méth. i. p. 606 (1783) ; Oliv. Fl. Trop. Afr. i. p. 96 ; var. *β*. Oliv., *l.c.*

Zenza do Golungo.—A subscandent shrub, 4 to 5 ft. high ; leaves coriaceous ; expanded flowers not seen ; in Acacia-groves near Calumguembo, rather rare ; in flower-bud in Sept. 1854. No. **974**. A scandent shrub, bristling with stipular spines directed downwards ; sparingly, in bushy places by the skirts of woods, near Camutamba, in the ascent towards Quicanda ; in flower-bud at the beginning of Sept. 1857. No. **974***b*.

Bumbo.—A robust almost arborescent shrub ; branches elongated,

very patent ; branchlets sarmentose ; flowers whitish ; stamens red-yellow ; in primitive woods, in stony scarcely or but little shaded places, between Bumbo and Bruco, at the foot of the mountains of Serra da Xella ; fl. Oct. 1859. No. **985.**

2. **C. corymbosa** Lam., Encycl. Méth. i. p. 605 (1783) ; Oliv. Fl. Trop. Afr. i. p. 96 ; var. **subglabra** Oliv., *l.c.*, p. 97.

Loanda.—A divaricately branched, subscandent shrub, as tall as a man ; flowers whitish ; fruit rubicund ; furnishes the best-flavoured capers. In bushy sandy places of the district, as far as Quicuje ; fl. and fr. from Jan. to March 1854. No. **990.**

3. **C. viminea** Oliv. Fl. Trop. Afr. i. p. 97.

Golungo Alto.—A much-branched scandent shrub; petals obovate-lanceolate, shaggy-tomentose outside (only one petal seen by Dr. Welwitsch ; the buds being infested with the larvæ of an insect, further examination was impossible). In dense thickets at the skirts of woods, only seen in one place, at the base of the mountains of Serra de Alta Queta ; in flower-bud August and Sept. 1856. No. **986.**

Oliver, *l.c.*, states that the species occurs also in the Eastern Himalaya and Tenasserim ; but the Indian plant is an erect shrub, with weaker less recurved prickles and larger foliage, and is apparently a different species.

4. **C. erythrocarpos** Isert in Beob. Ges. Naturf. Fr. Berl. iii. p. 334, t. 9 (1789) ; Oliv. Fl. Trop. Afr. i. p. 98 (*erythrocarpa*).

Ambriz.—Fruit when ripe bright scarlet. On bushy hills between Ambriz and Quibango, abundant ; in fruit Nov. 1853. No. **971.**

Golungo Alto.—A much-branched subscandent shrub as tall as a man ; petals herbaceous-green ; stamens yellowish ; style and stigma purple. The bark of this shrub is employed with much effect as a caustic by the natives. Ripe fruit scarlet, near Cacarambola, Feb. 1854 (a single specimen). In high bushy places, on the skirts of primitive woods, near Sange, and also between Chixe and Calôlo ; fl. 7 Sept. and Oct. 1856. No. **970.** A shrub 4 to 5 ft. high, subscandent, beset with prickles ; flowers similar to those of *C. spinosa* L. ; fruit baccate, ovoid-clavate, of a deep scarlet-red colour, of the size of a small pigeon's egg, longitudinally 6-7-ribbed ; at Sange Dec. 1854. Coll. Carp. 210. A spinous subscandent shrub ; leaves simple, elliptical-ovate ; fruit large, ovoid-pyramidal, angular-ribbed, bright scarlet. Near Cacarambola, June 1855. Coll. Carp. 211. A subscandent shrub, with pyramidal-ribbed bright scarlet fruit. At Sange end of Dec. 1855. Coll. Carp. 212.

Libongo.—A divaricately branched shrub, 4 to 6 ft. high, bristling with spines ; flowers greenish-white, sometimes very few, at other times abundant. Fruit of a fine scarlet colour, pyramidal-conical, as large as a large nut, many-seeded ; very frequent in bushy places from Banza de Libongo to the ascent of the neighbouring mountains ; fl. end of Sept. 1858. No. **972.** In wooded thickets around Banza de Libongo ; in flower-bud beginning of Oct. 1858. No. **973.**

It is apparently the shrub alluded to by Welwitsch, Apont. p. 555, under n. 120, of which he states that the bark of the root is called by the negroes "Sûna," and is used by them as a caustic and sudorific. Coll. Carp. 947 may perhaps belong to the same ; its fruit is glabrous, ovoid, marked by 6 ridges, measures 2 in. long by 1 in. thick, and has a peduncle of 1 in.

6. **RITCHIEA** Br.; Benth. & Hook. f. Gen. Pl. i. p. 110.

1. **R. fragrans** Br. ex Walp. Rep. Bot. Syst. i. p. 201 (1842); Oliv. Fl. Trop. Afr. i. p. 100.

Golungo Alto.—A widely scandent shrub; branches flexuous, strong, scattered with little white warts; flowers greenish-yellow, or in shaded places almost quite green, terminal, and also frequently axillary. In the more elevated dense thickets near Sange, around the spring of Capopa, Sob. de Bumba, rare and always sporadic; fl. and young fr. end of August 1855. No. **987**.

Zenza do Golungo.—A weak scandent shrub, 5 to 7 ft. high; branches soon twisted, pendulous; flowers greenish; petals very lax, flaccid, soon pendulous or turned in; ripe fruit not seen. Sporadic, by the denser thickets between Chixe and Calumguembo; fl. and young fr. 5 Sept. 1857. No. **988**.

The following plant is doubtfully placed in Capparideæ; it may perhaps belong to the genus *Boscia*:—

Mossamedes.—A little tree, 8 to 15 ft. high, with a slender stem; trunk 1½ to 3 in. in diameter, straight, at the apex lax and with a spare crown; branchlets terete, covered as well as the leaves with a short soft scurvy tomentum; leaves glaucous, very thickly coriaceous, very rigid, alternate, linear-lanceolate, very obtuse, emarginate, rounded at the base, ranging up to 5 in. long by nearly 1 in. broad; petiole to ⅔ in.; midrib strongly marked beneath, less so and in relief above; lateral veins numerous, not conspicuous; stipules 0. In rocky mountainous places between Maiombo and Cazimba, by side of the Huilla road, without flowers, Oct. 1859. No. **978**.

X. MORINGACEÆ.

1. **MORINGA** Burm.; Benth. & Hook. f. Gen. Pl. i. p. 430.

1. **M. aptera** Gaertn. Fruct. ii. p. 315 (1791); Oliv. Fl. Trop. Afr. i. p. 101.

Sierra Leone.—The specimens gathered were lost by decay during the voyage between Sierra Leone and Prince's Island in Sept. 1853.

Welwitsch suggested that this Natural Order might possibly be placed with Bignoniaceæ, a suggestion which has also been made by Dalzell.

XI. VIOLACEÆ.

The Violaceæ of Angola increase continually in number of species and of individuals as the country rises towards the east—that is, towards the interior of the continent—so that the greatest number of species are found in the district of Pungo Andongo; and they become rarer towards the 14th or 15th degree of south latitude, and then cease altogether; at least, none were met with in the highlands of Benguella, neither in the primitive forests of Bumbo nor on the plateau of Huilla, where Welwitsch collected a large number of species. *Calceolaria* (*Ionidium*) was met with only in the littoral regions.

The species of *Rinorea* (*Alsodeia*) are either shrubs or small trees and mostly bear evergreen leaves; they constitute, in com-

pany with Rubiaceæ, Filices, and some genera of Artocarpeæ, the underwood of the primitive forests. Welwitsch found in the very dry year of 1857 several species which he had previously seen with flower-buds in the month of October 1856 in the same condition during the succeeding months until May. As several species of *Alsodeia* have very elastic branches, which even after being dried preserve their green colour, they are employed by the negroes as snares for birds and small quadrupeds of the forest, and are known by the name of "Tesse" or "Quitesse"; such species are *R. Aucuparia*, *R. brachypetala*, and *R. dentata*: see Welw. Apont. p. 555, n. 123. The wood of *R. Aucuparia* is very firm almost throughout, and of a white-yellowish colour; it is held in much esteem for small domestic utensils, handles of hammers, etc.

1. **CALCEOLARIA** Loefling, Iter, p. 113 (1758), non Feuill. (1766). *Ionidium* Vent. (1803); Benth. & Hook. f. Gen. Pl. i. p. 117.

1. **C. enneasperma** O. Kuntze, Rev. Gen. Pl. i. p. 41 (1891). *Ionidium enneaspermum* Vent. Jard. Malm. p. 27 back (1803); DC. Prodr. i. p. 309; Oliv. Fl. Trop. Afr. i. p. 105.

Loanda.—In maritime sands at Penedo, April 1854, and in hilly, bushy, tall-grassy places near Boa Vista, fl. and fr. May 1854. No. **880**. In dampish sandy-earthy meadows of the island Cazanga, near Cabo Lombo, fl. and fr. May 1854. No. **881**. At the clayey margins of dry pools near Musegue do Luis Gomes, June 1854 (only one specimen). No. **881***b*. An annual or sometimes a biennial herb; root thinly woody; stem much branched from the base; branches somewhat pilose; corolla spurred; petals white from the base to the middle, above towards the apex bluish violet, spur presenting a concavity rather than a tube; not uncommon in shortly grassy dampish pastures, also in rather dry groves of *Adansonia*, near Imbondeiro dos Lobos, fl. and fr. March 1858. No. **879**. In sandy groves of *Adansonia* amongst a sparse herbage, near Quicuje, fl. and fr. Nov. 1857. No. **879***b*. Represa de Quicûxe, in moist as well as in dry situations; fr. May 1854. Coll. Carp. 213.

2. **RINOREA** Aubl. Hist. Pl. Guian. i. p. 235, t. 93 (1775). *Alsodeia* Thouars (1807); Benth. & Hook. f. Gen. Pl. i. p. 118.

1. **R. ardisiæflora** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891). *Alsodeia ardisiæflora* Welw. ex Oliv. Fl. Trop. Afr. i. p. 108.

Pungo Andongo.—A slender bush of 8 ft., with a densely leafy crown; trunk straight; flowers whitish-yellowish, soon turning yellow; three sepals equal, two a little longer, all obtuse, rounded at the apex, ciliate; petals 5, all equal, lanceolate, sessile, broad at the base, quite reflexed from the middle at the time of flowering, rather obtuse, ciliolate; stamens 5, combined at the base into a thick ring which is densely bearded outside at the mouth, terminated by an ovate-lanceolate straight erect rather rigid appendix which far exceeds the anther-cells; ovary sessile, 1-celled; placentas 3; style straight, moderately thickened towards the apex and thus quasi-clubshaped; stigma terminal. At the borders of the primitive forests of Mata de Pungo, within the fortress; fl. Jan., young fr. April 1857. No. **885**.

This species is recorded from the Island of St. Thomas, where it is stated that the local name is "Sôá-Sôá": see Henriques in Bol. Soc. Brot. x. p. 100 (1892). The following No. from this island should be compared with the same :—

Island of St. Thomas.—A bush or occasionally a tree of 25 ft., with the habit nearly of *Prunus Padus* L.; leaves deciduous, glossy; flower-buds (very young) arranged in short oblong bracteate axillary masses. In the more elevated forests, at an elevation of 2000 to 2500 ft.: Dec. 1860. The timber is used for rafters. Called by the negroes "Sóa Sóa." No. **459**. See Ficalho, Pl. Ut. p. 91 (1884).

2. **R. ilicifolia** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia ilicifolia Welw. ex Oliv. Fl. Trop. Afr. i. p. 108; Welw. in Trans. Linn. Soc. xxvii. p. 12.

Ambaca.—A little shrub, 1 to 2 ft. high; probably sprung up after the burning of the woods, with shining leaves and without flowers; sparingly in wooded thickets by the streams, between Quibinda and Izanga, October 1856. No. **888**.

Pungo Andongo.—A bush 8 to 12 ft. high, remarkably resembling in habit and shape of leaves *Ilex Aquifolium* L.; flowers yellow as if made of wax; calyx also coralline-yellowish; calyx and young petals rather fleshy, unfortunately not seen when fully expanded; capsules coriaceous, of a pretty bright purple colour, 3-valved, usually 3-seeded, dehiscing in an elastic manner; in the narrow shady valleys amongst the gigantic rocks of Barrancos de Catete, within the fortress, at an elevation of 3500 ft.; in flower bud in Jan., Feb., and May 1857, and in not quite ripe fruit Feb. 1857; rather rare. No. **889**.

3. **R. cymulosa** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia cymulosa Welw. in Oliv. Fl. Trop. Afr. i. p. 108.

Zenza do Golungo.—In dense masses by streams; at the left bank of the river Chixe, between Mongolo and Calolo; in young flower Sept. 1854. No. **891**.

4. **R. Aucuparia** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia Aucuparia Welw. in Oliv. Fl. Trop. Afr. i. p. 109.

Pungo Andongo.—Native name "Quitesse." A shrub, 4 or 5 ft. high, with the habit of a tree, repeatedly branched; sporadic, in the more elevated bushy rugged spots and near the summit of the Serra das Pedras Guinga, in company with *Myrothamnus*, fl. March 1857; on the top ranges a small sub-decumbent shrub of 2 ft. No. **893**. A small erect tree, 6 to 8 ft. high, with slender trunk, dense crown, very bright herbaceous-green shoots and branches, and coriaceous rather rigid leaves; in shady woods of Barranco de Songue, in rocky places, in flower-bud Jan., Feb., and May 1857. No. **892**.

Var. *β*. **platyphylla** (Welw. ms.). Leaves oval-obovate.

Pungo Andongo.—A small tree, 12 to 15 ft. high; trunk 2 to 3 in. diam.; branches erect-patent; branchlets patent; leaves dry-chartaceous, rather rigid. Sporadic in the very shady primitive woods of Mata de Pungo, in flower-bud April 1857. No. **892*b***.

5. **R. brachypetala** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia brachypetala Turcz. in Bull. Mosc. xxxvi. p. 558 (1863); Oliv. Fl. Trop. Afr. i. p. 109.

Golungo Alto.—A rigid evergreen shrub, $2\frac{1}{2}$ to $4\frac{1}{2}$ ft. high, rarely higher. Leaves rigidly chartaceous; flowers red-orange, rather larger than in *R. dentata*, hardly fragrant; calyx setose-hispid and like the petals rather fleshy. Frequent in primitive woods of the mountains of Serra de Alta Queta, growing sometimes in rather dry, at other times in damper situations, fl. end of Oct. and in Nov. 1855, fr. March 1856. Native name "Tesse." No. **895**. A form with longer petioles, in company with the ordinary form, fl. Dec. 1855; at the spring of Capopa, fl. March 1855. No. **895***b*. A broad-leaved form, also mixed with the ordinary form; a low subscandent shrub, 2 to 4 ft. high; leaves papery-coriaceous, occasionally with large teeth; in very shaded damp spots near the spring of Capopa in Sob. de Bumba, in flower-bud beginning of Dec. 1854. No. **895***c*.

6. **R. castaneoides** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia castaneoides Welw. in Oliv. Fl. Trop. Afr. i. p. 110.

Pungo Andongo.—Much branched, with the habit of *Castanea vesca* Gaertn. In rugged wooded places of Barranco de Songue, within the lines of fortification, fl. Dec. 1856, fr. Jan. 1857. No. **884**.

Var. ? **strictiflora** (Oliv., *l.c.*).

Cazengo.—A shrub of 4 ft., with white flowers. Sparingly in shady woods, amongst shrubs of *Coffea*, *Hugonia angolensis* Welw. Herb. 1585, etc., fl. and young fr. June 1855. No. **883**.

7. **R. dentata** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia dentata Oliv. Fl. Trop. Afr. i. p. 110.

Cazengo.—A shrub of 3 to 4 ft., apparently evergreen, with weak branchlets, quasi-subscandent amongst other shrubs. Capsules pendulous, clavate, trigonous, green-glaucous, covered with a very short almost obsolete tomentum; sparingly in elevated thickets on the left bank of the river Luinha, near the Serra de Muxaûla, Dec. 1854. No. **887**. A tall shrub, as high as a man; in the primitive woods of Cambondo, in young fruit June 1855. No. **887***b*. A shrub, 5 ft. high, branched from the base; leaves membranous, deep green above, paler beneath, rather glossy; in primitive very shady woods near Dalatanda, in young fruit June 1855. No. **890**. A subscandent shrub, with coriaceous trigonous-clavate somewhat tomentellous capsules. In elevated thickets at the river Luinha; seeds Dec. 1854. Coll. Carp. 214. Welw. Lichen No. 246 grew on the branchlets of this plant.

Golungo Alto.—An evergreen shrub, 1 to 5 ft. high; branches flexuous-divaricate; leaves papery, nearly dry; flowers when expanded pale sulphur-coloured, scentless, smaller than in *Alsodeia brachypetala* Turcz., paniculate; petals not strictly equal; capsules obovoid-trigonous or clavate-trigynous. Frequent in damp woods near cataracts of the river Cuanza and of Capopa near Sange, also in Zengas de Queta; fl. and fr. Jan., July, Sept., 3 Nov. 1855, March 1856. Native name "Tesse" or "Teze" or "Tesse Cabinda." No. **894**.

8. **R. Welwitschii** O. Kuntze, Rev. Gen. Pl. i. p. 42 (1891).
Alsodeia Welwitschii Oliv. Fl. Trop. Afr. i. p. 110.

Golungo Alto.—Remarkable for the small black dots on the lower surface of the leaves. Sparingly in primitive woods of Mata de Quisuculo, near Bango; in flower-bud Jan. 1855, without flowers March 1855. No. **882**. Welw. Fungi No. 156 grew on the leaves of this plant.

XII. BIXINEÆ.

1. **MAXIMILIANEA** Mart. ex Schrank in Flora ii., part i., p. 451 (1819). *Cochlospermum* Kunth (1822); Benth. & Hook. f. Gen. Pl. i. p. 124.

1. **M. angolensis** O. Kuntze, Rev. Gen. Pl. i. p. 44 (*Maximiliana*). *Cochlospermum angolense* Welw. Apont. p. 566; Oliv. Fl. Trop. Afr. i. p. 113.

Golungo Alto.—A tree 10 to 20 ft. high, 9 in. in diam. at the base of its trunk; branches divaricate; flowers very handsome, deep-yellow; fruit capsular, as large as a swan's egg. On rather dry and rocky slopes, between Sange and Camilungo, at the margins of forests, abundant; fl. from Feb. to beginning of May, fr. June and August 1856. No. **544**. A small richly leafy tree, with palmatifid foliage and handsome yellow flowers, flowering near Cambondo 19 Sept. 1854. Ripe capsules near Canguerasange Nov. 1854. Coll. Carp. 136. Ponte de Felix Simoës; capsules 5 Nov. 1854. Coll. Carp. 215, 216.

Ambaca.—Capsules July 1856. Coll. Carp. 217.

Welwitsch, Apont. *l.c.*, states that this species inhabits the dry hills of Golungo Alto and Ambaca, and also the sandy margins of the river Cuanza. The natives call it "Borotuto," and make from its inner bark coarse but very strong cords; the trunk abounds in yellow sap.

In a manuscript note Welwitsch suggests that all the three species of *Cochlospermum* Kunth, described in *Fl. Trop. Africa*, *l.c.*, are only varying forms of one species.

The following (of which there was only one specimen) must be compared with *M. tinctoria* O. K., *l.c.* :—

Pungo Andongo.—A small tree of 10 to 20 ft. or more, with rather spreading branches; trunk at the base ranging up to 1½ ft. in diam.; sometimes a shrub of 2 to 4 ft., branched from the base; leaves coriaceous, rather rigid; flowers large, perhaps the largest of the whole genus. In rocky thickets, near Cabondo and Catete, in the fortress of Pungo Andongo, fl. middle of Dec. 1856; also at the base of the rocks near Luxillo, and in dampish bushy places at the right bank of the river Cuanza near Candumba; fl. March 1857. No. **545**.

2. **BIXA** L.; Benth. & Hook. f. Gen. Pl. i. p. 125.

1. **B. Orellana** L. Sp. Pl., edit. 1, p. 512 (1753); Welw. Apont. pp. 555, 588, n. 58; Welw. Synopse pp. 41, 47, n. 129; Oliv. Fl. Trop. Afr. i. p. 114.

Golungo Alto.—A stout shrub of 5 to 8 ft., branched from the base, richly leafy; leaves by no means always quite entire, as Endlicher, Gen. Pl. p. 918 (1840), states, but those in the middle of the flowering branches usually and almost constantly bidendate at the base, with far-protruded acute teeth causing the leaf to be palmatifid or lobed: flowers rose-purple; outer 2 or 3 sepals herbaceous, the rest petaloid: petals twice as long as the sepals; anthers quite obtuse and not inflected in a hooked manner at the apex; style inflected in a hooked manner; capsule ovoid-conical, not compressed. Cultivated and half wild at the borders of forests and along the banks of rivulets, not uncommon near Sange and among the mountains of Serra de Alta Queta; occasionally in thickets near Canguerasange, fl. 3 Dec. 1854; in bushy places of Queta, fl. July 1855; in forests at the river Cuanza, along the base of the mountains of Queta; fl. and young fr. Jan. 1856. No. **531**.

A small tree of 12 to 15 ft., with a trunk of 4 in., or occasionally of nearly 6 in. in. diam. at the base. In the denser more elevated forests of Sobato Quilongo Quiacatubia, apparently quite wild, but perhaps originally introduced, sporadic ; fl. end of Jan. 1855. A small-leaved form. No. **532**. In the forests of the district, where it is used by the inhabitants as a red dye and called "Quissafu" ; it is the "Urucú" of the Brazilians. Coll. Carp. 116. Sobato Mussengue Dec. 1854 ; fruit. Coll. Carp. 218, 219. A small tree of 8 to 12 ft. ; seeds dyeing red ; Bango, middle of August 1856. Native name "Ditéque." Fruit. Coll. Carp. 220, 221.

The natives call this bush "Quisafu," and employ its seeds to prepare a red or yellow dye for various cloths that are fabricated from the leaves of palms ; moreover, the little baskets (*balayos*) of Pungo Andongo, which are made from the straw of a species of *Eleusine*, and which form one of the most valuable industrial productions of the people, owe part of their bright colouring to the dye prepared from the seeds. Among the negro medical men the seeds are reported as particularly stomachic. It must be considered to be perfectly acclimatised in Angola, since in not a few localities in the mountainous districts it occurs as a luxuriant plant, in company with other indigenous shrubs or small trees. (See Welw. Synopse p. 47.)

3. **ONCOBA** Forsk. ; Benth. & Hook. f. Gen. Pl. i. p. 125.

1. **O. spinosa** Forsk. Fl. Ægypt-Arab. pp. cxiii, 103 (1775) ; Oliv. Fl. Trop. Afr. i. p. 115 ; var. **angolensis** Oliv., *l.c.*, p. 116. *Oncoba* (sp.), Welw. Apont. p. 555, under n. 125.

Golungo Alto.—A small tree or a shrub with the habit of a *Camellia*, occasionally spinous ; flowers large, white, very strongly and pleasantly scented, like those of the fragrant hyacinths ; stigma occasionally quite entire, but usually with short lobes. In wooded places, between Sange and Bango, not abundant ; fl. Nov. 1854, and young fr. July 1856. No. **533**, **533***b*. At the borders of forests and palm-groves, near Sange, at Cambondo, rather rare ; with ripe fruit March 1856. Coll. Carp. 226, 227.

Bumbo.—A bush of 8 to 12 ft., very rarely of 15 ft. ; fruit aromatic, edible. On rocky declivities near Chaõ de Xella, abundant, and forming little woods ; fr. June 1860. No. **534**. A very elegant bush, 12 to 20 ft. high ; leaves evergreen ; fruit eaten by the negroes (and by Welwitsch). In the primitive forests of Serra da Xella, about 3000 ft. of elevation above sea-level ; fruits ranging up to 2 in. in diam. June 1860. Coll. Carp. 7, 222.

Island of St. Thomas.—Native name "Malimboque." A leafy shoot. No. **3021**.

2. **O. Welwitschii** Oliv. Fl. Trop. Afr. i. p. 117 ; Welw. in Trans. Linn. Soc. xxvii. p. 13, t. 3.

Heptaca ? (sp.) Welw. Apont. p. 588, n. 53.

Golungo Alto.—Sporadic, in primitive woods of Sobato de Bumba and in Mata de Quisucula, near Bango Aquitamba, and in secondary woods near Sange : fl. and fr. March and Nov. 1855, and Feb. and July 1856. No. **537**. An elegant bush ; branches erect ; leaves large, simple ; flowers large, starting from the trunk and leafless branches ; petals 6 to 9, whitish-rose ; fruit 5-valvular ; echinate outside with long prickles ; seeds very numerous, imbedded in pulp. Mata Quisucula, Sept. 1855 and 1857. Native name, "Xixi" or "Chichi." Seeds.

Coll. Carp. 135. A bush with orange-yellow fruit; Sange, March 1855. Seeds. Coll. Carp. 224. A bush with virgate branches, leafy at the apex and flowers arising from the thicker leafless branches in a fasciculate manner; fl. Feb. 1855, fr. May. Native name "Chiche onene." Seeds. Coll. Carp. 225.

3. **O. dentata** Oliv. Fl. Trop. Afr. i. p. 119.

Golungo Alto.—A frondose tree of 15 ft., or usually in secondary thickets a little tree of 10 to 12 ft.; trunk erect, divaricately branched at the apex; sepals 3, imbricate in æstivation; petals 6 to 7, white, hypogynous; stamens indefinite, inserted at the base of the ovary; filaments short; anthers long, linear-oblong, yellow, basifixed, erect, 2-celled; ovary superior, white-setose; fruit globular, densely beset with rather soft prickles, with several cells, of the size and shape of the fruit of *Ricinus minor* Mill., and of a deep orange colour. Sporadic in the primitive woods of Quisucula and at the borders of the forests of Serra de Alta Queta; fl. 15 Sept. and in Oct., fr. Jan. 1855 and 1856. Native names "Dibixi" or "Chixi" or "Fele." No. **535.** A small tree with a dilated crown; trunk erect, 2 to 4 in. in diam.; leaves as in *O. Welwitschii* Oliv., but smaller; flowers whitish; fruit bright orange. At the borders of primitive forests near Bango Aquitamba. Fruits. Coll. Carp. 223.

Pungo Andongo.—An arborescent shrub, with several stems from the base, erect; leaves rather rigidly chartaceous, dentate or repand; flowers whitish, spreading in a star-like manner. Rather rare in the dense woods of the fortress, in Mata de Pungo; fl. Dec. 1856. No. **536.**

4. **O. spinidens** Hiern, sp. n.

A small glabrescent tree, more than 10 ft. high; crown lax; branches rather patent, elongate-virgate, terete; leaves elliptic-oblong or obovate-oblong, acutely acuminate or cuspidate, rather wedge-shaped at the base, rigidly coriaceous, glabrous, very glossy and uniform in colour on both surfaces, spinulose-serrate, $4\frac{1}{2}$ to 6 in. long, by $1\frac{1}{2}$ to 2 in. broad or rather larger; mid-rib and venation in relief on both surfaces; petiole $\frac{1}{4}$ to $\frac{3}{8}$ in. long, obsoletely puberulous or glabrous, rather thickened and sometimes a little curved near the apex; stipules small, subulate, caducous; inflorescence axillary and subterminal, spicate-racemose, bracteolate, shortly pedunculate, (in bud) $\frac{1}{2}$ to $\frac{3}{4}$ in. long; flower-buds globose, subsessile, puberulous; sepals and petals together about 17, imbricate, rounded, ciliolate; outermost ones shorter than the middle ones; innermost ones the smallest, obovate, glabrous; stamens about 17 to 20, glabrous; ovary fleshy, glabrous; ovules several; stigma (in the bud) sessile, rather dilated, obscurely angled or trifid?, concave.

Pungo Andongo.—In the denser primitive forests, by the river Cuanza, near Candumba; in young flower-bud Jan. 1857; also a sterile specimen in rocky wooded places, near Candumba, in March 1857. No. **886.**

With this should be compared *O. Poggei* Gurke in Engl. Jahrb. xviii. p. 163 (22 Dec. 1893), a species from the upper Congo country, at Lulua, gathered by Pogge, n. 571; the leaves, however, of the Congo plant show less prominency in the mid-rib and venation, and they do not possess spinulose tips to the serrations.

4. **FLACOURTIA** L'Herit.: Benth. & Hook. f. Gen. Pl. i. p. 28.

1. **F. flavescens** Willd. Sp. Pl. iv. p. 830 (1805); Oliv. Fl. Trop. Afr. i. p. 121.

Golungo Alto.—A dicœcious widely frondose tree, 10 to 25 ft. high, with a rhamnoid habit; trunk armed, especially at the base, with long stout branched subvertical spines; branches, shoots and petioles reddish; leaves rather rigid, membranous, above yellowish-green, pale below, with slender prominent nerves. Calyx of the male flowers patelliform, obsoletely 3-5-lobed; disk waxy, of an orange-colour, covering the whole pan of the calyx, stellately furrowed on the surface, obsoletely lobed; stamens indefinite, arising from the centre of the disk, free, filiform, white, the central ones erect, the lateral ones archingly patent, the outer ones deflexed, anthers extrorse, 2-celled, longitudinally dehiscing, cells separate. Calyx of the female flowers 5-cleft; disk orange; styles 5 or 6, more or less cohering at the base, soon free; stigma dark purple. Berry green, then turning orange, edible, ellipsoidal. Sporadic in the more elevated primitive woods of Serra de Alta Queta; fl. and young fr. 4 Dec. 1855. No. **538.**

5. **DOVYALIS** Arn.; Benth. & Hook. f. Gen. Pl. i. p. 128. *Aberia* Hochst.; Benth. & Hook. f., *l.c.*

1. **D. macrocalyx** Warburg in Engl. & Prantl, Naturl. Pflanz. iii. p. 44 (*Doryalis*) (1893).

Aberia? macrocalyx Oliv. Fl. Trop. Afr. i. p. 122.

Pungo Andongo.—A small tree, 12 to 15 ft. high, divaricately branched above; branches spinous; spines $\frac{1}{5}$ to $1\frac{1}{2}$ in. long; leaves thinly coriaceous, yellowish-green on both sides; fruit baccate, orange-red, ovoid, involucred by the 6-8-partite calyx, crowned by 2 erect filiform softly hairy styles, smooth outside, mucous-pulpy within: seeds 2, erect, embedded, compressed-ovate, shortly beaked, loosely woolly outside; albumen fleshy-cartilaginous; embryo large, not curved; cotyledons flat, ovate-cordate; radicle pointed towards the beak of the seed. Sporadic in the deep depressions among the rocks of the fortress; fr. beginning of Nov. 1856. No. **540.**

The doubt expressed by Oliver, *l.c.*, with regard to the genus, must remain.

The two following plants, both gathered without either flower or fruit, bear a close resemblance to the above species:—

Huilla.—A shrub or perhaps a young tree; trunk 6 to 10 ft. high, already virgately branched a little above the base. In thickets between Mumpulla and Nene, Oct. 1859. No. **475.** A robust shrub, branchlets spinous, leaves distichous. In thin stony woods, near Mumpulla, on the highest ridges of Serra da Xella, Oct. 1859. No. **543.** This is apparently the plant referred to by Oliver, Fl. Trop. Afr. i. p. 123, in a note at the end of the genus *Aberia*.

2. **D. mollis** Warburg in Engl. & Prantl, *l.c.* (*Doryalis*).

Aberia mollis Oliv. Fl. Trop. Afr. i. p. 122.

Pungo Andongo.—A much-branched spinous bush, 10 ft. high; habit similar to that of *Diospyros Dendo* Welw.; leaves membranous, beset above with short blackish rather rigid hairs, and beneath with a yellowish down, soft; flowers apparently dicœcious; sepals of the pistilliferous flowers 5 or 6, green, pilose, rather spreading; ovary depresso-globose, pilose, bearing at the apex 3 or 4 firm erect styles,

with numerous spreading stigmatose lobes at the tip; cells of the ovary apparently each with several ovules. By thickets in moist rocky situations, near Catete; sporadic; in female flower-bud 28 Feb. 1857. No. **539**. A patently branched little tree; trunk straight; branches and branchlets spinous, leaves softly coriaceous, yellowish-green beneath; calyx deeply 6-8-cleft, divided nearly to the base; immature fruit baccate, globose, hirsute outside, juicy, as large as a hazel-nut, mostly 3-celled, bursting the 6-8-partite calyx, crowned at the apex with the firm style which is divided into 4 or several stigmas; cells 1-seeded, seeds hirsute. In dampish rocky places within the fortress at Barrancos de Catete; in young fruit 12 May 1857. No. **539***b*..

Var. *β*, **lanceolata** (Oliv., *l.c.*, p. 123).

Pungo Andongo.—A slender little tree, 10 to 12 ft. high, with spreading spinous branches and whitish-tomentose flower-buds. In bushy stations at the cataract of Condo of the river Cuanza, sporadic; in flower-bud March 1857. No. **546** (not 546*b*).

XIII. PITTOSPOREÆ.

1. **PITTOSPORUM** Banks; Benth. & Hook. f. Gen. Pl. i. p. 131.

1. **P. coriaceum** Ait. Hort. Kew. ed. 1, iii. p. 488 (1789); Lowe Fl. Mad. i. p. 104.

Island of Madeira.—Fruit. Sr. J. M. Moniz. Coll. Carp. 228.

2. **P. viridiflorum** Sims, Bot. Mag. t. 1684 (1814).

P. abyssinicum Del., var. *angolensis* Oliv. Fl. Trop. Afr. i. p. 124.

Huilla.—A small evergreen floribund tree, 10 to 12 ft. high, much branched, aromatic-resinous in most parts; branches whitish, erect-patent, subfastigiate; leaves thinly coriaceous, glossy above, pale and reticulate-venulose beneath; flowers densely panicled at the apex of the branchlets, pale yellow, very nicely and powerfully fragrant with an aroma combining those of Syringa and Orange; calyx short, 5-partite to the base, segments obtuse, ciliolate. Petals 5, claws connivent into a short tube, limb rather spreading. Stamens rather perigynous than hypogynous, erect; ovary 2-3-celled; cells 2-3-ovuled; style thick, straight, firm; stigma truncate-capitate, at the time of fecundation furnished with a milk-white glutinous exudation round which the anthers adhere. The flowers last a long time, and especially in a dry season remain long in bud. Not uncommon in thin sandy woods about the large lake Ivantâla; in flower-bud Jan. 1860, fl. beginning of Feb., fr. May 1860. No. **1034**. An arborescent shrub, 6 ft. high, with a dilated divaricate crown and tortuous very rigid branches and branchlets; flowers whitish-yellow. Sporadic in stony spots in Morro do Monino, at an elevation of 5500 ft. above the sea; fl. March, fr. May 1860. No. **1034***b*.

XIV. POLYGALACEÆ.

Throughout the coast regions of Angola proper the Polygalaceæ are scarce, and are represented only by two forms of an herbaceous *Polygala*; even in the hilly regions the number of species is not much increased, though there occur two genera, *Securidaca* and *Carpolobia*, which consist of woody plants. One species of *Securidaca* is a gigantic creeper, with a trunk from 2 to $2\frac{1}{2}$ ft. in

circumference, climbing on trees to the height of 60 to 80 ft. In the highland region the species are much more numerous, some being of remarkable elegance. (Welwitsch, Apont. p. 562.) The Order is entirely absent from the coast region of Mossamedes, and towards the interior it first appears in Benguella near Bumbo; all the species from that district up to the high plateau are small plants with insignificant flowers; but when the plateau of Humpata is reached two species are met with, which produce an important effect on the physiognomy of the landscape; one of them, *Securidaca longepedunculata* Fresen., is a tree so large that Welwitsch took breakfast under its shade, and the other, *Polygala Gomesiana* Welw., is an herbaceous plant, 3 to 5 ft. high, with magnificent flowers, fit to become one of the finest ornaments of European gardens. Many of the species are perennial; and several annual species, which occur between Pungo Andongo and Talla-mungongo, appear to be wanting in Huilla.

1. **POLYGALA** L.; Benth. & Hook. f. Gen. Pl. i. p. 136.

1. **P. africana** Chodat, Mon. Polygal. i. p. 99 (1891), ii. p. 168, t. xxi. fig. 20, 21 (1893).

P. micrantha Oliv. Fl. Trop. Afr. i. p. 131, *part.*, *non alior.*

Pungo Andongo.—A tender elegant annual herb, with an erect tree-like habit, branched in the upper part in a broom-like manner. Bracts ovate-lanceolate, acuminate, very deciduous; lateral bracteoles very small, subscarious, linear, rather obtuse, shorter than the bract and persisting longer, but at length deciduous. Flowers rose-colour or occasionally rose-purple; keel not crested on the back, but usually the apex of the keel fringed with 3 to 5 very small linear obtuse ligules of unequal length. Seed pilose with curved hairs. Abundant but in few localities, in rather moist shortly grassy pastures near the rivulet of Catete, within the fortress; in company with *Kyllingia triceps* Rottb., *Cyperus uncinatus* Poir., and *C. capillipes* C. B. Clarke; fl. beginning of Feb., fl. and fr. April 1857. No. **1009**. Flowers whitish-rose. In shortly grassy meadows near Quisonde, on the right bank of the river Cuanza; gregarious, but only in one place; fl. March 1857. No. **1009***b*. A graceful erect branched rather fleshy and bitter herb; stem acutely angular; leaves scattered, narrowly linear-lanceolate, herbaceous-green; racemes spike-like, pedunculate; flowers always milk-white and rather fleshy, wholly glabrescent; outer sepals lanceolate, subequal, one-third as long as the obovate-circular obtuse shortly clawed wings; petals free a little above the base, rather broad, keel sparingly crested, rather shorter than the wings; crest sometimes very small, in other cases more developed, and consisting of 3 or 4 or even 8 obtuse usually apical dorsal fimbriæ; capsule much shorter than the wings, circular, very shortly stipitate, a little or scarcely emarginate at the apex, deeply sulcate, quite smooth, the older ones becoming turgid on both sides; seeds obvoid-elliptical, with a very small or obsolete caruncle, wholly beset with scattered rather thick whitish rather rigid hairs inflexo-capitate in a circinate manner at the apex; stamens constantly 8, with yellow proportionately large anthers. On the damp shortly grassy slopes of the mountains of Serra de Pedras de Guinga (the Scorpion Mountains), at an elevation of 3500 ft.; fl. and fr. March 1857. No. **1010**.

Huilla.—A slender herb, with the habit almost of *Salomonia* Lour.; leaves bright green, scattered, subpatent-erect; flowers rose-purple, almost globose when fully developed; keel 4-8-fimbriate at the apex; capsule circular, scarcely or shortly emarginate; seeds clothed with hairs curved down at the apex. Scattered and nearly always in company with species of *Xyris* and dwarf *Cyperaceæ*, by rivulets, near the great lake of the Hippopotamus (Lagôa de Ivantala), at an elevation of 5000 ft.; fl. and fr. March 1860. No. **1021**.

2. **P. spicata** Chodat, *l.c.*, ii. p. 221, t. xxiii. fig. 36, 37.

Huilla.—A graceful little herb 1 ft. high; stems erect, filiform, variously branched, sparingly leafy; leaves, especially the lower ones, lanceolate, flat, not subulate; bracts and bracteoles scarious-whitish, soon deciduous; flowers milky-white-greenish, drying quite pale sulphur-coloured, arranged in long spikes; the three outer sepals ovate-acuminate, white; wings obovate-oblong, attenuate towards the base into a short claw, milk-white, soon turning pale sulphur-yellow, three times as long as the outer sepals and as the capsule; capsule ovate-orbicular, apiculate not emarginate at the apex, quite smooth, without any marginal line; seeds shortly ellipsoidal, beset all over with whitish rather rigid somewhat curved hairs; caruncle very small or even obsolete. In marshy grassy situations, at the margins of forests, near Lopollo, in company with species of *Gladiolus*, *Drosera*, and *Eriocaulon*, abundant; fl. and fr. Nov. and 3 Dec. 1859. No. **1027**.

3. **P. persicariæfolia** DC. Prodr. i. p. 326 (1824); Oliv. *l.c.*, p. 129, *part.*; Chodat, *l.c.*, i. p. 127, ii. p. 331, tab. xxvii. fig. 22, 23.

Bumbo.—Branches and racemes very patent; interior sepals ovate-orbicular; bracts persistent. Leaves flaccid and softly puberulous. In less dense thickets, at the base of Serra da Xella, at altitude about 1800 ft. above the sea; very sporadic; fl. and fr. Oct. 1859. No. **1028**.

4. **P. Gomesiana** Welw. ex Oliv., *l.c.*, p. 126; Welw. Sert. p. 14, t. 4; Chodat, *l.c.*, ii. p. 336, tab. xxvii. fig. 32—34 (1893).

Huilla.—Pollen-grains spherical or ellipsoidal, longitudinally costate-striate, sometimes throwing out pollen-tubes even while the anther is unopened. Not uncommon in damp meadows amongst high grass by streams near Lopollo, at an elevation of 3000 ft.; fl. and fr. Feb. and March 1860. No. **1032**. A perennial herb, 3 to 5 ft. high, slightly branched; leaves lanceolate, deep-green; flowers handsome, very crowded, arranged in long panicled racemes, very pretty purple-violet, persisting for a long time. Much the most beautiful of all known species of the genus. In moist situations by the streams near Lopollo and Humpata, fl. Jan. to April 1860. Coll. Carp. 10.

5. **P. arenaria** Willd. Sp. Pl. iii. p. 880 (1800); Oliv. Fl. Trop. Afr. i. p. 128 (*maximâ parte*); Chodat, *l.c.*, i. p. 127, ii. p. 337, tab. xxvii. fig. 35, 36 (1893).

Several different forms are included in the following:—

Golungo Alto.—In exposed sandy places alongside the banks of the river Luinha, by no means frequent; fl. and fr. June 1855. No. **993**. On grassy slopes of Serra de Alta Queta, fl. March 1856. No. **998**. An annual herb; branches ascending; flowers white-greenish; leaves dimorphic, those on the primary stem elliptic-lanceolate, those on the branches linear-lanceolate or quite linear; in the more elevated pastures of the Queta mountains above Camilungo, but not frequent; fl. 1855. No. **998***b*. Simple or variously branched; in neglected cultivated places

and in grassy places, at the borders of woods, by the banks of the river Cuanza; fl. and fr. Oct. to Dec. 1854. No. **999**.

Pungo Andongo.—An annual rather hirsute erect herb; flowers whitish with a tinge of purple; in wooded pastures between Condo and Bumba, only one specimen in flower March 1857. No. **1002**. Flowers almost entirely white; exterior sepals white-green, interior sepals milk-white, greenish in the middle; corolla whitish, fimbriæ of the crest long, filiform; not uncommon in damp meadows by the banks of the river Cuanza, near Mopopo, fl. and fr. April 1857. No. **1007**. An annual erect herb: leaves membranous, beneath pale-green turning whitish; flowers milk-white; wings white-green; corolla almost altogether whitish; fruit orbicular-obcordate, narrowly winged towards the apex, hispid-ciliate on the winged margin. In secondary thickets, formerly wooded, between the rivers Caghuy and Cuanza; fl. and fr. Jan. 1857. No. **1016**.

6. **P. Livingstoniana** Chodat, *l.c.*, ii. p. 339, t. xxvii. fig. 38.

Huilla.—Wings and corolla whitish. In wooded meadows, the trees chiefly consisting of *Proteaceæ* and *Syzygium*, in the territory of Moninho (or Monino); fl. and fr. beginning of April 1860. No. **1025**.

7. **P. Stanleyana** Chodat, *l.c.*, ii. p. 340, t. xxvii. fig. 39; var. **angustifolia** Chodat, *l.c.*

Golungo Alto.—On the more elevated grassy slopes of Sobato de Quilombo-Quiacatubia, at an elevation of about 2200 ft.; sporadic; fl. and fr. 1855. No. **999***b*.

Pungo Andongo.—Wings whitish-greenish; corolla rose-coloured. In wooded meadows, between Condo and Quisonde, not far from the right bank of the river Cuanza; fl. March 1857. No. **1011**. Sepals green; wings whitish; keel, etc., whitish or pale violet. In elevated shortly grassy pastures among the mountains of Serra de Pedras de Guinga; fl. and fr. Jan. 1857. No. **1017**. An annual herb, erect, sometimes rigidly so; leaves bright green; racemes very densely spicate-imbricate; flowers whitish-greenish, larger than in No. 1017; the three outer sepals herbaceous-green; wings obliquely obovate, whitish, green at the base; corolla whitish; keel crested; capsule emarginate, hispidulous-ciliolate; seeds clothed with rather rigid hairs directed downwards; caruncle large, whitish. In wooded meadows, at the banks of the river Cuanza, near the islands called Ilhas de Calemba; fl. and fr. March 1857. No. **1017***b*.

Chodat founds this species partly on Welwitsch, "No. 1015 *a* pro parte": but the whole of the No. 1015 in the British Museum set is, on the authority of Dr. Chodat himself, *P. Welwitschii* β *ovatifolia* Chodat, as quoted below.

8. **P. Welwitschii** Chodat, *l.c.*, i. p. 127, ii. p. 341, t. xxvii. fig. 40.
P. arenaria var. *andongensis* Oliv. Fl. Trop. Afr. i. p. 128.

α **linearifolia** Chodat, *l.c.*

Pungo Andongo.—An annual slender herb, branched from the base; branches ascending; leaves linear, membranous, bright green; flowers green-purplish; a variety not noticed in the district of Golungo Alto; in rocky sparsely grassy places, among the more elevated gigantic rocks of Pedra de Cazella, within the lines of fortifications; fl. 18 Dec. 1856. No. **1008**. In grassy hilly places at the great cataract of the river Cuanza, near Condo; fl. and fr. March 1857. No. **1008***b*. Annual; stem short, densely branched; branches divaricate-ascending; flowers from white to violet-greenish; in dampish grassy thickets by the road

leading from Ponte de Luxillo towards Cambambe, sparingly; fl. May 1857. No. **1012**. Interior sepals green ; corolla slightly rose-coloured ; frequent and gregarious in marshy places near the lake of Quibinda, then nearly dry, in company with *Utricularia exilis* Oliv. ; fl. in the rainy season, March 1857. No. **1013**.

Huilla. — Annual, erect, 1 to 5 in. high ; leaves elongate-linear, erect, rather fleshy, purplish-green above, 1-furrowed, yellowish-lepidote beneath, midrib keel-shaped, thick, bright purple ; flowers rose-coloured, densely spicate-racemose, exceeded by the involucrate leaves ; in dampish pastures of Morro de Lopollo, at an elevation of 5500 ft. ; fl. and fr. Feb. 1860. No. **1026**.

β **ovatifolia** Chodat, *l.c.*

Pungo Andongo.—A small annual pale green herb ; stems sometimes simple, at other times branched, very slender, tenacious ; flowers whitish ; in shortly grassy marshes of the drying lake of Quibinda ; fl. and fr. March 1857. No. **1014**. A small annual herb ; leaves membranous, subglaucous-green ; flowers variegated with green and purple ; fruit ellipsoidal, often emarginate at the apex ; seeds covered all over with rather rigid appressed hairs ; in grassy thickets between Quisonde and Condo ; fl. and fr. end of March 1857. No. **1015**.

9. **P. Chodatiana** Hiern, sp. n.

A small annual herb ; stem short, densely branched from the base ; branches crowded, ascending, forming little tufts, hirsute, leafy, somewhat striate towards the apex ; leaves narrowly oval or obovate-oblong, rounded or sub-apiculate at the apex, more or less wedgeshaped to the shortly petiolate base, scattered with hairs especially on the narrowly revolute margin and on the midrib, green above, rather paler beneath, $\frac{1}{2}$ to 1 in. long by $\frac{1}{8}$ to $\frac{1}{4}$ in. broad ; racemes terminal and axillary, $\frac{3}{8}$ to $\frac{3}{4}$ in. long, $\frac{1}{3}$ to $\frac{1}{2}$ in. thick, shortly pedunculate, not involucrate, subglobose or ovoid or oblong, mostly strobiliform, densely flowered ; bracts small, persistent, spreading, lanceolate, acute, scattered with hairs ; flowers $\frac{1}{8}$ to $\frac{1}{6}$ in. long, shortly pedicellate, more or less nodding or reflexed, lilac-greenish, turning reddish, capitate ; pedicels $\frac{1}{12}$ to $\frac{1}{8}$ in. long, arching, thinly hairy ; sepals persistent ; anterior sepals elliptical, ciliolate, free, $\frac{1}{15}$ in. long ; posterior sepal elliptical, $\frac{1}{10}$ in. long, hairy on the back and margins ; wing-sepals broadly obovate, broader than the capsule, rounded above, narrowed at the base to a short claw, somewhat hairy on the margin and along the midrib at the back, $\frac{1}{5}$ in. long by $\frac{1}{8}$ in. broad, with venation sparingly anastomosing ; keel crested, $\frac{1}{12}$ in. long, clawed at the base, hooded at the apex, hairy along the back ; crest bilobed, with plurifid lobes ; upper petals about $\frac{1}{18}$ in. long, oblong, obtuse ; anthers not sessile on the staminal tube ; style long, bent, slender ; lower stigma inconspicuous ; capsule obovoid, $\frac{1}{8}$ in. long, ciliate ; seeds oblong, $\frac{1}{12}$ in. long, hairy ; caruncle not falcate, short.

Ambaca.—In wooded, shortly grassy, rather elevated pastures near the great cave of Puri Cacarambola, sporadic ; fl. and fr. Oct. 1856. No. **1001**. Pamba, Oct. 1858 ; fl. and fr. Coll. Carp. 229.

Nearly allied to *P. Welwitschii* Chodat, but not glabrescent.

10. **P. erioptera** DC. Prodr. i. p. 326 (1824); Chodat, *l.c.*, p. 342, t. xxviii., fig. 1-4.

P. triflora Oliv., *l.c.*, p. 128 (non L.), var. *a. diffusa* Oliv., *l.c.*, p. 129.

Var. **angolensis** Chodat, *l.c.*, ii. p. 344.

Loanda.—Some specimens suffruticose, others herbaceous. Frequent in hilly grassy places around the city of Loanda, namely at Penedo, Conceiçaõ, Zamba grande, Boa Vista, etc.; fl. and fr. April, July and August 1854. No. **992**. A small annual herb, erect, in old age usually decumbent and almost suffruticose; flowers greenish-rose-coloured; a stricter form with more elongated and narrower leaves; frequent on sandy-stony and clayey-sandy hills, also in nearly dry pools, especially near Maianga de Povo, etc.; fl. at end of Jan. and in Feb. 1858. No. **992***b*.

Ambaca.—An annual herb, with white-purplish flowers; frequent in exposed stony and adjacent neglected cultivated places around N-gombe; fl. Oct. 1856. No. **1000**. In dry exposed stations, near Ambaca, Oct. 1856. Coll. Carp. 230.

Pungo Andongo.—In clayey stony places of the fortress of Pungo Andongo, very sporadic (no specimen separated for the British Museum); fl. Dec. 1856. No. **1003**.

11. **P. Myrtillopsis** Welw. ex Oliv. Fl. Trop. Afr. i. p. 130; vix Chodat, *l.c.*, ii. p. 491.

Huilla.—Suffruticose, with a vaccinioid habit; stems patently hairy; branches ascending from the thick many-headed root, cæspitose, pubescent, a palm high or shorter; leaves oblong-elliptic, rather rigidly chartaceous, bright herbaceous-green, on both sides closely scattered with slender elevated veins; margins ciliate; petiole very short, alate-flat; racemes few-flowered, flowers nodding, bracts and bracteoles persistent; interior sepals obliquely obovate-cuneate, attenuate below, green, ciliolate; keel crested with rather long fimbriæ, whitish-violet, soon pale-yellowish; capsule broadly obcordate, ciliate at the margin, one cell rather prominent at the apex. Seeds cuneate-oblong, covered with rather rigid dense white shining straight hairs; strophiole large, yellow-brown. Rather rare, in sandy-clayey hilly thinly bushy places, near Lopolla, in company with species of *Gnidium* and *Thesium*; fl. Nov. 1859. No. **1029**.

The specimen in Herb. Kew. received from Lisbon under this name is *P. rarifolia* DC.

12. **P. huillensis** Welw. ex Oliv. Fl. Trop. Afr. i. p. 133; Chodat, *l.c.*, i. p. 74, ii. p. 366, tab. xxviii. fig. 43-45.

Huilla.—Suffruticose; stems radiately decumbent, rather rigid, fragile; leaves and flowers rather fleshy; peduncles acutely angular; interior sepals green; keel of the corolla violet-coloured, crested; capsule short, emarginate; in elevated sandy-clayey stony pastures, between Lopollo and Humpata, fl. and fr. Jan. 1860. No. **1030**. Stems numerous, distorted; leaves rather fleshy; interior sepals green; corolla bright blue, keel crested; in the denser sandy thickets between Mumpulla and Nene, at an elevation of 4500 ft., in company with species of *Thesium* etc., fl. and fr. Oct. 1859. No. **1031**. A short-leaved form, var. *buxifolia* Welw., intermixed with but rarer than No. 1031, gathered at the same time in flower. No. **1031***b*.

13. **P. sparsiflora** Oliv. Fl. Trop. Afr. i. p. 127; var. *β.* Oliv., *l.c.*, p. 128; Chodat, *l.c.*, ii. p. 491.

P. ukirensis Gürke in Engl. Bot. Jahrb. xiv. p. 310, *fide* Chodat *ms.*

Pungo Andongo.—Three sepals green, wings whitish, corolla pale lilac. In dampish pastures, at the river Cuanza, between Condo and Quisonde, very few specimens, fl. and fr. March 1857. No. **1018**.

14. **P. rarifolia** DC. Prodr. i. p. 332; Oliv. Fl. Trop. Afr. i. p. 132; Chodat, *l.c.*, ii. p. 367, tab. xxix. fig. 5-7.

Pungo Andongo.—An undershrub, 2-3 ft. high; stem and branches virgate, erect; flowers greenish-violet; the three outer sepals green, the two interior ones whitish; keel blue-violet; capsule smooth, oblong, acutely bilobed; sparingly in dampish sandy thickets, at the right bank of the river Cuanza, near Sansamanda, in fl. and young fr. Dec. 1856. No. **1019**. Stem straight, 2-3½ ft. high; flowers whitish-rose-coloured; on bushy hills between Bumba and Condo, fl. March 1857. No. **1019***b*. Ranging up to 4 ft. in height; habit strict, rush-like; the three outer sepals green-yellowish, the two interior ones as well as the corolla yellowish; capsule bilobed, with the tooth-like remains of the style in the sinus; in the dryer grassy places at the borders of woods near Catete, rare fl. and fr. May 1857; the natives employ the macerated stems for cords. No. **1020**.

Huilla.—Interior sepals milk-white, deep blue at the apex; keel whitish-violet; capsule unequally 3-lobed, that is, the remains of the style very much produced in the sinus of the 2 lateral lobes; in the higher rather sandy thickets near Fonte de Lopollo, very sparingly, fl. April 1860. No. **1024**.

Var. **melanophleba** (Welw.) ex Oliv., *l.c.*, p. 133.

Huilla.—Annual, slender, erect, 1½ to 2 ft. high, rush-like, virgately branched; leaves linear, rather rigid, very caducous; interior sepals yellowish with black veins; keel violet-blue, fimbriate-crested, the remaining petals pale or whitish yellow; seeds brown-black, beset with distant very patent hairs; sporadic in damp sparingly bushy pastures, between Lopollo and Nene, at elevations of about 5000 ft., fl. and fr. 27 April 1860. No. **1022**.

The following is a form with shaggy-pubescent inflorescence:—

Huilla.—In stony thickets between Lopollo and Fazenda do Ferraõ da Sola, sparingly, fl. Jan. 1860. No. **1023**.

2. **SECURIDACA** Siegesb., L; Benth. & Hook. f. Gen. Pl. i. p. 138; non Tourn.

1. **S. longepedunculata** Fresen. in Mus. Senck. ii. p. 275 (1837); var. **parvifolia** Oliv. Fl. Trop. Afr. i. p. 134 (form with the ventral margin of the wing of the fruit much inflected near the base).

Pungo Andongo.—A bush 4 to 7 ft. high; trunk straight, 1 to 1½ in. thick, crowned by a low divaricately branched head; flowers variegated, whitish, violet, and rose; in thin woods on a ferruginous clayey soil about Quibanga, fl. and fr. Jan. 1857. No. **1005**. A shrub, 3 to 4 ft. high, divaricately branched; leaves fleshy-coriaceous; flowers rose-coloured; not uncommon, but rarely flowering, in low sandy thickets about Ponte de Luxillo, Dec. 1856; about Pungo Andongo, Feb. 1857. No. **1006**.

Huilla.—A shrub of 3 to 4 ft. with few branches, more rarely a small tree of 6 to 10 ft. with dilated crown ; branches always divaricate, occasionally spinous, flowers violet-purple ; in wooded stony bushy places, at an elevation of 4500 ft., near Nene, but always sporadic, fl. Oct. 1859, fr. Jan. 1860. No. **1033**.

2. **S. Welwitschii** Oliv. Fl. Trop. Afr. i. p. 135.
Lophostylis floribunda Welw. Apont. p. 562.

Golungo Alto.—A robust evergreen shrub, climbing up the tallest trees and ornamenting their crowns with innumerable flowers and filling the whole vicinity with very sweet fragrance ; stems usually $\frac{1}{3}$ to $\frac{1}{4}$ ft. in diameter at their base ; branchlets and even the thicker branches glossy with a grass-green bark, smooth, the young ones occasionally striate, the older ones reflexed-arched ; leaves thinly coriaceous, glossy, flat, not revolute at the margin ; flowers variegated with white and rose-colour ; calyx 5-sepalous, with three shorter sepals and two large brilliant-white lateral ones ; petals 3, the front one galeate-folded in the form of a keel, investing the sexual organs, white, rose-coloured at the apex ; the two back petals broadly linear, fleshy, straight, rose-coloured at the base, at the apex brilliantly sulphur-coloured and truncate, shorter than the front one and overlying it in an imbricate manner, quite patent in full flower ; stamens monadelphous, 8, ascending, combined into a vertically compressed tube cleft in front ; filaments white, equal in height, free at the apex ; anthers erectly fixed at the apex of the filaments, yellow, apparently opening longitudinally with 2 or 3 pores ; ovary obcordate, in the centre of the thick turgid annular disk, terminating in the violet-coloured ascending style ; stigma shortly clavate-capitate, green, papillose-viscid, usually bearded with the closely adhering and dried up pollen. In the densest primitive forests alongside streams among the mountains of Serra de Alta Queta ; fl. from 19 Mar. to June, fr. from May to Sept. 1855-56, occasionally. No. **994**. A stout shrub, climbing 30 to 40 ft. high, with numberless very agreeably fragrant flowers variegated with white and purple. Central Queta. Ripe fr. June 1856. Coll. Carp. 231.

On the living trunks of this species grew the Lichen No. 255.

Var. β **platyphylla** Welw. ms. in Herb. A scandent shrub, 6 to 7 ft. high ; the upper part of the stem as well as the branches and branchlets purple ; leaves broadly ovate, almost subcordate, thinly coriaceous, constantly but narrowly revolute on the margin, brightly glossy above, a little paler beneath.

Golungo Alto.—In shady little woods, near N-déle (N-della), rather rare ; fl. Feb. 1856. No. **995**.

The structure of the stem in this creeper is extremely curious, and it appears to be a character in the genus ; for Dr. Kirk observed the same arrangement of the vascular bundles in the wood of another species from the Zambesi country.

3. **CARPOLOBIA** G. Don ; Benth. & Hook. f. Gen. Pl. i. p. 139.

1. **C. alba** G. Don, Gen. Syst. i. p. 370 (1831) ; Oliv. Fl. Trop. Afr. i. p. 135.

Golungo Alto.—An evergreen shrub, not scandent, 3 to 8 ft. high, repeatedly branched ; branches long, thin, spreading, leafy : leaves rather fleshy, subcoriaceous, bright green, with a long acumen at the apex, regularly undulate at the margin ; flowers (in bud) apparently

white, two petals spotted with violet at the apex ; stamens constantly 5, all fertile, without trace of any staminodes ; filaments combined at the base into a tube cleft in front, free from the middle upwards ; anthers basifixed ; ovary conical, subcompressed, somewhat obliquely seated on the large spongy disk or gynophore, gradually acuminate at the apex into the curved somewhat compressed style, terminating in the thinly capitate stigma, mostly 3-celled, sometimes by abortion 2-celled, very rarely 1-celled ; cells 1-ovuled ; ovule pendulous, turgid, more or less ellipsoidal ; fruit tenaciously fleshy, bright scarlet or of a deep orange colour, baccate, ovoid-trigonous or clavate-oblong and trigynous, as large as a hazel-nut, mucronate at the apex, subpendulous, edible. In palm-groves and in primitive forests, throughout the district, especially near N-déla (Undelle) and at the spring of Capopa ; also at the banks of the river Delamboa and along the public road from Trombeta to Cambondo ; abundant ; fl. and fr. June to Oct. and Dec. to Feb. 1855-56. No. **996.** A shrub of 3½ ft. with erect-patent branchlets. In woods near Trombeta, sporadic. A form with narrow and very acute leaves, without either fl. or fr., Sept. 1857. No. **997.** A shrub, 4 to 6 ft. high ; flowers white ; fruit broadly ovoid, trigonous, fleshy, orange-red, sweet, edible, 3-seeded. Fruit, near the river Delamboa, June and end of July 1856. Coll. Carp. 232.

Pungo Andongo.—A shrub, 5 to 6 ft. high, with long sparse branches, thinly coriaceous leaves, and whitish-rose flowers. In wooded situations, in Barrancos da Pedra Songue, rather rare ; fl. and young fr. Dec. 1856. No. **1004.**

XV. FRANKENIACEÆ.

1. **FRANKENIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 141.

1. **F. ericifolia** Chr. Smith in Buch, Allgem. Uebers. Fl. Canar. p. 30 (1819) ; var. *a*, **microphylla** Schmidt, Beitr. Fl. Cap Verd. Ins. p. 271 (1852).

Cape de Verde Islands.—Frequent on sandy volcanic hills behind Villa de Mindello, near Porto Grande, in St. Vincent Island, fl. Sept. 1853. No. **1094.** Near Villa de Mindello, Porto Grande, in stony-sandy dry places, at the sea-shore ; abundant ; fl. Jan. 1861. No. **1095.**

XVI. CARYOPHYLLACEÆ.

The Clove Pink (*Dianthus Caryophyllus* L.) is commonly cultivated in Angola, but the flowers very rarely come to even tolerable perfection.

1. **SILENE** L. ; Benth. & Hook. f. Gen. Pl. i. p. 147.

1. **S. Burchellii** Otth. in DC. Prodr. i. p. 374 (1824) ; Oliv. Fl. Trop. Afr. i. p. 139.

Huilla.—Ferraõ da Sola and around Lopollo, occasional in potato-fields ; fl. and fr. Dec. 1859. No. **1082.**

2. **STELLARIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 149.

1. **S. Mannii** Hook. f. in Journ. Linn. Soc. vii. p. 183 (1864) ; Oliv. Fl. Trop. Afr. i. p. 141.

St. Thomas' Island.—Stems ranging up to 2 ft. in length, rooting at each node. Gregarious in the more elevated mossy spots in the forests of Monte Caffé, in company with *Peperomia Fernandopoana* C.DC., and with species of Hepaticæ ; fl. and fr. Dec. 1860. No. **1085.**

2. **S. media** L. apud Cyrill. Char. Comm. p. 36, t. 2, f. 9 (1784); Oliv. Fl. Trop. Afr. i. p. 141, in note.

Ambriz.—Occasional, in cultivated ground around the town of Ambriz, without doubt formerly introduced with seeds of culinary plants from Europe, fl. and fr. Nov. 1853. No. **1069**.

3. **SPERGULA** L.; Benth. & Hook. f. Gen. Pl. i. p. 152.

1. **S. arvensis** L. Sp. Pl. ed. 1, p. 440 (1753); Oliv. Fl. Trop. Afr. i. p. 143, in note; var. **vulgaris** Syme, Engl. Bot. ii., p. 127 (1865). *S. vulgaris* Boenningh. Prodr. Fl. Monast. Westphal. p. 135 (1824).

Huilla.—Seeds beset with papillæ. Common in cultivated places near Lopollo: for example, in fields of maize and of flax, the seed of which latter had been imported from Germany; fl. and fr. May 1860. No. **1084**.

4. **DRYMARIA** Willd.; Benth. & Hook. f. Gen. Pl. i. p. 152.

1. **D. cordata** Willd. ex Roem. et Schult. Syst. v. p. 406 (1819); Oliv. Fl. Trop. Afr. i. p. 143.

Prince's Island.—Sparingly in neglected cultivated places, by the roadside towards Pico de Papagaio, fl. and fr. Sept. 1853. No. **1068**.

Golungo Alto.—An ascending viscid opaque-green annual herb, infesting fields of cultivation; flowers inconspicuous, greenish. Among plants of *Phaseolus* and of *Arachis*, in some places plentiful, in others rare, and in some years absent; by the banks of the river Coango, near Sange, fl. and fr. April 1856. At the base of "Dia iá Calunga" (*Dracæna parviflora* Baker; Welw. Herb. 3739), in wooded places near streams, fl. and fr. March 1855 and July 1856. No. **1070**.

5. **POLYCARPA** Loefl. Iter Hisp. p. 7 (1758). *Polycarpon* L. Syst. ed. 10, p. 881 (1759); Benth. & Hook. f. Gen. Pl. i. p. 152.

1. **P. pusilla** Roxb. apud Wight & Arn. Prodr. p. 358 (1834) (*Polycarpon pusillum*).

Polycarpon Loeflingii Benth. & Hook. f. Gen. Pl. i. p. 153; Oliv. Fl. Trop. Afr. i. p. 144. *Pharnaceum depressum* L. Mant. Pl. alt. p. 562 (1771). *Polycarpa prostrata* O. Kuntze, Rev. Gen. Pl. i. p. 51 (1891) *pro parte*.

Ambriz.—A decumbent or ascending, apparently annual herb, clothed with white villous hairs on the stem and on the lanceolate acuminate leaves. On sandy hills among short grass near the river Quisembo, in places flooded in summer but then dry; fl. and fr. Nov. 1853. No. **1073**.

Libongo.—Sepals broad, with white membranous margins; petals whitish, very thin, narrowly lanceolate; capsule incompletely 3-celled, nearly 1-celled; seeds very numerous and small, ovoid or oblong-ovoid. Abundant and gregarious, but seen only in one place, in clayey swamps nearly dried up, about the lake of Libongo, on the left bank of the river Lifune, in company with *Azolla pinnata* Br., forma terrestris (Welw. Herb. No. 37), etc.; fl. and fr. Sept. 1858. No. **1076**.

Ambaca.—A prostrate herb; stems spreading in the form of a star; bracts and stipules scarious whitish. Rather rare, in swampy spots on the left bank of the river Lucala, from which Welwitsch extricated himself with difficulty; fl. and fr. Oct. 1856. No. **1074**.

Mossamedes.—An annual prostrate grass-green herb; the radical leaves rosulate, the stem-leaves pseudo-verticillate. In damp sandy places, not far from the banks of the river Bero, at Cavalheiros; fl. and fr. July 1859. No. **1083**. A prostrate, much branched, rather fleshy, annual herb, with purplish or green-purple stems, rose-coloured petals, and purple sepals and capsule. July 1859. Coll. Carp. 233, 234.

6. **POLIA** Lour. Fl. Cochinch. p. 164 (1790). *Polycarpæa* Lam. (1792); Benth. & Hook. f. Gen. Pl. i. p. 154.

1. **P. arenaria** Lour. Fl. Cochinch. p. 164 (1790).

Polycarpæa corymbosa Lam. Tabl. Enc. ii. p. 129, n. 2798 (1793); Oliv. Fl. Trop. Afr. i. p. 145.

Huilla.—In the more elevated thickets of the Morro de Lopollo, in company with small plants of Compositæ and Acanthaceæ, fl. and fr. April 1860. No. **1080**. Flowers brilliantly white; frequently in open sandy forests of "Panda" (*Berlinia paniculata* Benth.), about the great lake of Ivantâla, fl. and fr. beginning of March 1860. No. **1081**.

Var. **effusa** (Oliv., *l.c.*).

Huilla.—In the elevated shortly grassy pastures of Empalanca, between Lopollo and Humpata, rather rare; a herb, apparently perennial, rhizome woody, stems numerous snow-white tomentellous, flowers whitish; fl. and fr. May 1860. No. **1078**. In very elevated shortly bushy sandy pastures, inundated in the rainy season, in Morro de Lopollo, frequent, in company with *Isoëtes* and *Ophioglossum*, flowers from white to pale rose, fl. and fr. April 1860. No. **1079**.

Var. **parviflora** (Oliv., *l.c.*).

Loanda.—In the living state elegant, red-purple, inflorescence shining with a golden-brown or claret colour; petals whitish, very tender, rather broad; capsule triquetrous; abundant in one locality, in sandy cultivated fields and in low thickets, between Teba and Quicuxe, fl. and fr. April to July 1854. No. **1072**. In fields above Penedo, frequent, fl. and fr. June 1858. No. **1072***b*. In sandy thickets by the road leading to Calumbo, fl. and fr. May 1858. No. **1072***c*.

Var. **linearifolia**. *Polycarpæa linearifolia* DC. Prodr. iii. p. 374, Oliv., *l.c.*, p. 146.

Pungo Andongo.—In sandy fertile woods, near Muta-Lucala, on the right bank of the river Cuanza, abundant; fl. and fr. March 1857; forms with inflorescence more or less capitate, mixed together. No. **1075**. In sandy thickets, between Condo and Quisonde. No. **1075***b*.

XVII. PORTULACEÆ.

The *Portulaceæ* rapidly diminish in number of species with the distance from the sea coast, and thus they appear with much greater abundance in the highland region, where the rocky or sandy soils of Pungo Andongo are much more favourable to these plants, which in general prefer to live under climatic conditions analogous to those of succulent plants; the Purslane (*Portulaca oleracea* L.) occurs everywhere in the greatest abundance just after the rains; they not rarely cover extensive pieces of cultivated lands, especially infesting crops of "Jinguba" (*Arachis hypogæa* L.). See Welw. Apont. p. 557, and Ficalho, Pl. Ut. p. 93 (1884).

1. **PORTULACA** L.; Benth. & Hook. f. Gen. Pl. i. p. 156.

1. **P. oleracea** L. Sp. Pl. edit. 1, p. 445 (1753); Welw. Apont. p. 557, under n. 132; Oliv. Fl. Trop. Afr. i. p. 148.

Loanda.—Frequent in the richer spots of cultivated ground, almost everywhere throughout the district, especially in kitchen-gardens; fl. and fr. May 1854. No. **1101**.

Golungo Alto.—Very common in places of cultivation and in waste places, especially among crops of *Phaseolus* and *Arachis hypogæa* L., which it smothers if neglected; also in places far removed from human habitations; about Sange and in Luiz Gomes' garden, fl. and fr. March and Sept. 1856; in the great field (Varzea grande) of the Cuango, fl. and fr. March 1856. No. **1102**.

Pungo Andongo.—An annual, fleshy-succulent herb, nearly ubiquitous in waste places, in dry fields and among crops; stems and branches sometimes prostrate, at other times copious and all erect, reddish; flowers yellow, fugacious; petals 5, obovate, deeply emarginate at the apex, almost bilobed. In both sterile and gravelly as well as cultivated places, especially among culinary vegetables, about Caghuy and throughout nearly the whole district: rather rare, however, in the direction of Condo; also frequently met with in places far removed from the dwellings of men. Employed by the negroes as well as the colonists as a pot-herb. Portuguese name "Beldroéga"; called by the negroes "Jinbembe." At Pungo Andongo, fl. and fr. Feb. 1857. No. **1103**.

2. **P. foliosa** Ker, Bot. Reg. t. 793 (1824); Oliv., *l.c.*

Loanda.—A herb, 4 to 6 in. high, much branched at the rootstock, with ascending stems and fleshy hairy brittle leaves, or sometimes with gradually glabrescent stems becoming woody towards the base. Occasional in dry exposed rather gravelly places, above the city of Loanda, near Museque de Luiz Gomes, fl. and fr. May and July 1854. No. **1099**.

Pungo Andongo.—A greenish-glaucous, hard, rigid herb, succulent in the upper part, mostly ascending. Sparingly at the rocks by the great cataract of the river Cuanza, near Condo, fr. March 1857. No. **1104**. A prostrate, yellow-greenish herb, with fleshy leaves and yellowish flowers. Abundant in sandy shortly grassy spots at the right bank of the river Cuanza, near Sansamanda, fl. and fr. 7 Feb. 1857. No. **1105**.

3. **P. quadrifida** L. Mant. i. p. 73 (1767); Oliv., *l.c.*, p. 149.

Loanda.—A fleshy herb, apparently persisting for several years; rhizome polycephalous; stems reddish, branched, rooting at the nodes, creeping far forward, succulent; the flowering branches erect, leafy; leaves opposite, ovate or ovate-oblong or rarely lanceolate, fleshy, smooth-glaucous, very shortly petiolate, involved up to the middle with white rather curly wool; flowers sessile on the branches, terminal, half concealed within the leaves and wool, yellow; calyx disepalous; segments widely ovate, whitish-membranous; petals 4, scarcely unguiculate, patent, obovate-oblong, yellow, rather large in proportion to the size of the plant; stamens 12, half as high as the petals, erect, filaments hyaline-pilose at the base; style filiform, a little thickened upwards and like the stamens yellow, a little taller than the stamens; stigmas 4, filiform-subclavate, patently recurved, densely papillose. Occasional, in dry hilly stony exposed places, and rarer by maritime rocks near Maianga del Rei, and in Praia de Zamba Grande (where a variety with rose-coloured flowers was observed); fl. and fr. Dec. 1853, March 1854, 3 Jan. 1859. No. **1100**. Coll. Carp. 235.

Forma **pendula** Welw. ms. in Herb.

Stem 1½ to 4 ft. long or more, smooth, persisting for several years, pendulous, brittle, cylindrical, rose-purple, glassy ; nodes more distant than in the type ; leaves oblong-lanceolate, rather thick, glaucous-green, densely bearded in the axils ; calyx very deeply bilobed membranous-whitish, surrounded with whitish pilose hairs, involucred by the leaves ; petals 4, yellow, elongate-ovate, cruciately opposite, rather obtuse but mucronate, quickly marcescent ; stamens 12, shorter than the petals ; filaments filiform, bifariously bearded ; stigmas 4, linear, $\frac{1}{18}$ in. long, deflexed.

Loanda.—By dampish densely bushy rocks to the east of Loanda, near Boa Vista, fl. and fr. Feb. 1854. No. **1100***b*.

The following has been doubtfully referred to this species by Oliver, *l.c.* :—

Mossamedes.—A small fleshy perennial herb, root fusiform, stems short, succulent, purple, prostrate-ascending, pilose at the nodes ; capsule as in the genus. Sporadic in bushy places near red-sandy rocks by the river Bero, at Boca do Rio Bero, fr. July 1859. No. **1108**.

4. **P. saxifragoides** Welw. ex Oliv. Fl. Trop. Afr. i. p. 149.

Pungo Andongo.—A little herb, with the habit of *Saxifraga biflora* All. or of *S. oppositifolia* L., 1 to 2 or occasionally 3 in. high ; annual ? or perhaps lasting for several years by means of its fleshy rather thick simple rhizome, which is divaricately fibrous towards its apex ; stems small, cylindrical, fleshy, purple, brittle, several and prostrate-ascending from the apex of the rhizome, the younger ones densely leafy, with distant branches ; leaves exactly opposite, sessile, ovate or ovate-lanceolate, fleshy, flat-convex, rather obtuse (almost as in *Sedum dasyphyllum* L.), $\frac{1}{12}$ to $\frac{1}{6}$ in. long, succulent, glaucous-green, greenish-purplish in the living state, very densely villous at the axils, with the hairs conglomerated and but little conspicuous on the living plant but spreading and exceeding the leaves on the dried plant ; internodes $\frac{1}{12}$ to $\frac{1}{6}$ in. long, the uppermost ones shorter ; flowers crowded in a capitate manner at the apex of the stems and branches, involucrate there with the ovate-lanceolate crowded leaves, milk-white, $\frac{1}{6}$ to $\frac{1}{5}$ in. long, tubular-campanulate ; calyx white, tubular at the base, sessile, bifid, with elongate-ovate concave obtuse lobes, reaching one third the height of the corolla ; corolla gamopetalous from the base to near the middle, tubular below with 4 obtuse lobes and slightly spreading limb ; stamens 4, alternating with the corolla-lobes and inserted a little below their base, erect, included ; filaments very slender ; anthers elongate-oblong, with 2 linear cells ; style filiform, equalling the corolla, rather deeply bifid at the apex, with the lobes stigmatose on the internal face ; capsule concealed by the leaves of the involucre, subsessile, spherical-conical, shining, narrowly mammillate at the apex with a conical opening ; seeds few, orbicular-subreniform, occasionally rather compressed, black, glossy, delicately punctulate. In the elevated rocky parts of the mountains called Pedras de Guinga, among short and scanty herbage, rare and seen in only one locality ; fl. and fr. March 1857. No. **1106**.

5. **P. sedoides** Welw. ex Oliv. Fl. Trop. Afr. i. p. 149.

Pungo Andongo.—A dwarf annual herb, 1 to 2 in. high, almost wholly red-purplish, with the habit of a *Sedum* or a *Cochlearia* or often of *Montia fontana* L. ; stems erect or ascending, dichotomous or tri chotomous ; leaves opposite, fleshy, papillose-striate (as well as the

stem); flowers sessile, rose-red, fugacious; calyx tubular, bifid to the middle, whitish-rose, deciduous with the corolla; corolla tubular, deep rose-red, 4-cleft, fleshy-membranous, very tender, dissolving, with obovate equal lobes patent at the time of flowering; stamens 4, alternating with the corolla-lobes, inserted a little below their base, sub-exserted; anthers oblong, with 2 linear cells; ovary 1-celled; ovules numerous; style filiform, sub-exserted, with 2 hairy diverging lobes stigmatose on the inner face; capsule bright red, membranous, sub-depresso-globose, circumscissile, 1-celled; seeds 3 to 7, fuscous-black when ripe, cochleate; placentation basal. Abundant, on the gneiss rocks and fragments of rocks thrown down on the flat land about Caghuy, among short mossy herbage on the east of the fortress; fl. and fr. 15 Feb. 1857. No. **1107**. An annual herb, 1 to 2 in. high, fleshy, blood-red throughout. At the rocks of Pungo Andongo; fr. April 1857. Coll. Carp. 239.

This is the plant referred to by Welwitsch, Apont. p. 557, under n. 132, as a new genus, with the habit of *Sedum rubens* L., which grows in such dense masses on the rocks of Pungo Andongo as to make them at a distance glow with a purple colour.

2. **TALINUM** Adans.; Benth. & Hook. f. Gen. Pl. i. p. 157.

1. **T. cuneifolium** Willd. Sp. Pl. ii. p. 864 (1799); Oliv. Fl. Trop. Afr. i. p. 150.

Loanda.—A perennial undershrub, stems many, erect or tortuously twisted, many-angled at the base, the younger ones acutely or rather alately triquetrous, virgate; leaves obovate-spathulate, green-shining; flowers handsome, rose-purple. Frequent in bushy stony places at the base of rocks, etc., throughout the district, Samba Grande, Cabo-Lombo, etc.; fl. and fr. July 1854. Also a succulent perennial suffruticose herb, 1½ to 2 ft. high; leaves fleshy, bright green, mucronate; flowers racemose, rose-coloured, rather large for the genus, nearly open in the sun; peduncles and pedicels bracteate. In dry little-elevated hilly places, near the sea-shore, between the city of Loanda and the mouths of the river Cuanza, near Tanza; fl. and fr. end of Feb. 1858. No. **1098**. Coll. Carp. 240.

2. **T. caffrum** Eckl. & Zeyh. ex Drège, Zwei Pflanz. 225 (1843); Oliv., *l.c.*, p. 150.

Loanda.—A fleshy, brittle, apparently perennial herb; rootstock thick, producing numerous stems branched from the base; branches quite patent, gradually shorter, as well as the stems turning purple; leaves thick, glaucous-green, entire; flowers large for the genus, yellow, expanded in full daylight; not uncommon in muddy-sandy and rocky maritime situations, near Penedo and Praia da Zamba Grande; fl. and fr. March 1854. Also a fleshy undershrub, twisted or with ascending cylindrical branches; leaves thick, elliptical, mucronate, delicately wrinkled on both surfaces, glaucescent; flowers yellow, rather large, fugacious; peduncles all axillary, solitary, gradually thickened from the middle upwards, bibracteolate at the middle, at length after fertilisation of the flower arching-reflexed. In dry situations, near Maianga da Povo; fl. and fr. beginning of May 1858. No. **1097**. A perennial herb, persisting at least for several years; root thick, ranging up to 1 in. in diam., at first vertical, at length closely surrounded with quite patent fibres. In rugged situations and in sandy fields at Alto das Cruzes; fl. and fr. middle of Dec. 1858. A form with narrow leaves. No. **1097***b*. Alto das Cruzes, fl. and fr. July 1858. No. **1097***c*.

Island of St. Thomas.—A herb in gardens, abundant ; fr. Dec. 1860. Apparently belonging to this species, or perhaps to *T. crassifolium* Willd. Coll. Carp. 118.

The following No., represented by a few poor specimens, perhaps belongs to the last species or rather to *T. crassifolium* Willd. :—

Ambriz.—A herb almost suffruticose ; stem with quite patent branches ; leaves fleshy, lanceolate, quickly falling off in the course of drying. At the maritime rocks near Ambriz in the direction of Mossul, not uncommon ; fl. Nov. 1853. Welwitsch had occasion to traverse this region in rapid flight, under pursuit by the natives. No. **1096.**

XVIII. TAMARISCINEÆ.

These plants afford excellent firewood.

1. **TAMARIX** L. ; Benth. & Hook. f. Gen. Pl. i. p. 160.

1. **T. gallica** L. Sp. Pl. ed. 1, p. 270 (1753); Oliv. Fl. Trop. Afr. i. p. 151.

T. senegalensis DC. Prodr. iii. p. 96 (1828).

Cape de Verde Islands.—Frequent in sandy maritime places and in gravelly places by the stream on Monte Verde of the island of St. Vincent near Porto Grande, and near the village of Mindello forming little woods, which are called Taraffaes ; fl. and fr. August 1853. Native name "Taraffa," derived from the Arabic word "Tarfa." No. **1087.**

2. **T. orientalis** Forsk. Fl. Ægypt.-Arab. p. 206. n. 29 (1775).

T. articulata Vahl (1791); Oliv., *l.c.* ; Ficalho, Pl. Ut. p. 94 (1884).

Mossamedes.—A small tree, 10 to 18 ft. high, rarely higher up to 25 ft., usually a shrub 4 to 7 ft. high and then branched from the base ; stems cæspitose, purplish ; leaves glaucescent, sheathing, blade more or less blunt or reduced to a subulate apiculus ; flowers whitish or rosy ; inflorescence of two forms, spicate and occasionally on the same plant solitary and axillary ; capsules all 3-valved ; very abundant, in sandy places by the banks of the rivers Bero and Maiombo, penetrating far into the interior of the continent, usually covered with *Cassytha*, fl. and fr. end of June 1859. Called by the colonists "Cedro." Branches sometimes affected with galls, which cause strobiliform excrescences. 15° 8′ S. Lat. No. **1086.**

Bumbo.—A tree, 25 ft. high ; sporadic, in little woods by the gravelly banks of streams, near Quitibe de Cima, at an elevation of about 1800 ft., in fl. without fr. at the beginning of June 1860. No. **1086*b*.**

It was found in the southern part of Portuguese Guinea, at the mouth of the river Cunene, by Fernando da Costa Leal, and mentioned by the name of "Cedros" in his Travels. It is called "'N' cedro" by the negroes.

XIX. ELATINEÆ.

1. **BERGIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 163.

1. **B. polyantha** Sond. in Linnæa xxiii. p. 16 (1850).

Mossamedes.—An annual herb, with the appearance of an *Anagallis* or rather of a *Polycarpa* ; stems subterete, cæspitose, purple, prostrate ; branches opposite ; leaves opposite, glaucescent, rather fleshy, very delicately and distantly denticulate towards the apex ; stipules 2, white,

scarious, those of the lower nodes obtuse, those of the upper nodes lanceolate, long-acuminate, cleft or laciniate at the apex; flowers solitary, axillary, pentamerous, hermaphrodite; peduncles capillary, $\frac{1}{4}$ to $\frac{3}{4}$ in. long, spreading; sepals rather fleshy, green with red edges; petals elliptical, concave, very obtuse, rosy, the early ones imbricate and shorter than or equalling the sepals, the older ones rather exceeding the sepals, inserted at the bottom of the calyx; stamens 10, inserted with the petals, 5 opposite and 5 alternate to them, all fertile and equal; filaments white, subulate from a broader base, sub-erect; anthers articulate-cordate, introrse, 2-celled; cells longitudinally dehiscing, whitish-yellow; pollen white; ovary large, sessile, more or less spherical-conical, 5-celled; cells many-ovuled. In hot moist sandy situations at the banks of the river Bero, abundant; fl. and fr. July 1859. No. **1053**.

Benguella.—In sandy places, nearly dried up, at the back of the city of Benguella, uncommon and partly destroyed; in fr. July 1860. No. **1056**.

XX. HYPERICINEÆ.

Nearly all the plants of this Natural Order in Angola proper belong to *Psorospermum* or to allied genera, and the majority of the species form handsome trees of middle size, with glossy evergreen foliage; the trunks abound in a kind of resin of a blood-red colour, and the bark furnishes the natives with a remedy in much repute against marsh and other fevers; the negroes of Golungo Alto call these trees "Mutûne," and those of Pungo Andongo give them the name of "M-Bulambia" (Welw. Apont. p. 560, n. 140).

1. **HYPERICUM** L.; Benth. & Hook. f. Gen. Pl. i. p. 166.

1. **H. Lalandii** Choisy in DC. Prodr. i. p. 550 (1824); Oliv. Fl. Trop. Afr. i. p. 155.

Huilla.—A herb, 3 to 4 in. high; stems numerous, ascending; flowers yellow; calyx somewhat glandular. Frequent in low sandy-spongy thickets by streams, near Humpata, fl. and fr. May 1860. No. **1054**. A form with broader leaves, apparently biennial; flowers yellow. Frequent, in damp pastures near streams and the shores of lakes, in sandy-clayey shortly grassy spots throughout the district, by the stream of Lopollo, fl. and fr. Feb. 1860. No. **1054***b*. A viviparous form, proliferous soon after the equinoctial rains; in pastures by the stream Quipumpunhime, in Sob. Humpata, Oct. 1859. No. **1054***c*.

2. **H. Schimperi** Hochst. ex A. Rich. Fl. Abyss. i. p. 97 (1847); Oliv., *l.c.*, p. 156.

Var. γ. Oliv., *l.c.*, p. 157, **huillense**. A shrub 4 to 6 ft. high; stem erect, woody, branched from the base; branches virgate-elongate; leaves glaucescent; flowers yellow, rather large; calyx-segments ovate-obtuse or rounded, often submucronate, ciliate with stalked black glands, subcoriaceous, 5 or very rarely only 4; petals isomerous; styles combined up to the apex, surmounted by a capitate obscurely 5-lobed stigma. Huilla.—Rather rare, in elevated woody bushy places, at an elevation much above 5000 ft., in Morro de Lopollo, not yet in full flower 23 May 1860. No. **1055**.

2. **PSOROSPERMUM** Spach; Benth. & Hook. f. Gen. Pl. i. p. 167.

1. **P. febrifugum** Spach in Ann. Sc. Nat., ser. ii., vol. v. p. 163 (1836); Oliv. Fl. Trop. Afr. i. p. 158.

Cazengo.—A small tree, branched almost from the base; trunk 4 in. in diam. near the base, erect; branches erect-spreading; flowers white tinged with rose; in rather dry bushy high-grassy places (capinaes), near Cacula and by hills near the river Luinha; fl. Dec. 1854. No. **1057**.

Golungo Alto.—The native name "Mutûne" is applied to this plant as well as to the one next following species. A tree of 10 ft. (or perhaps a young tree); branches erect-patent, lax; flowers whitish-rose; in elevated stony hilly places of Serra de Alta Queta, towards the river Luinha, in company with "Unday" (*Gardenia Joris-tonantis* Hiern); fr. July 1856. No. **1058**. A tree, 6 to 10 ft. high; trunk 2 to 3 in. in diam.; bark corky, said to be a febrifuge; flower whitish to whitish-rose; in the drier especially in the secondary thickets throughout the Sob. de Bumba; fl. Oct. 1855. No. **1059**. A tree, springing up after the burnings (Queimadas); flowering shoots emerging from the trunk; on the drier slopes of Sobato Cabanga-Cacalungo, near the base of Mount Cungulungulo; fl. Sept. 1855. No. **1059***b*. A tree of 6 to 10 ft., occasionally of 12 to 15 ft., with a crown more or less pyramidal; on the drier wooded slopes of the mountains of Capopa, near Sange; fl. Feb. 1855. No. **1060**. A tree of 8 to 10 ft. (perhaps a secondary shoot of a larger burnt tree); in secondary thickets of the more elevated hills of Sobato Bumba; in young fr. Dec. 1855; Menha lula, in young fr. May 1855. No. **1060***b*. A tree of 10 to 15 ft., or in secondary thickets usually destroyed by fire and then forming a shrub; leaves softly but thickly coriaceous, green above; flowers whitish-reddish; frequent in thickets by the borders of primitive woods of Sobato de Bumba and near Bango-Aquitamba; fl. Dec. 1855. No. **1061***b*. Native name "Cabreî"; used as a remedy against the itch (Sarna).

Pungo Andongo.—An arborescent shrub, with the branchlets compressed at the nodes and with white flowers. Bark used by the natives as a febrifuge and in cases of leprosy. In secondary thickets of the fortress, near Cazella; in fl. and young fr. Dec. 1856. Native name "M'-Bulambia." Welw. Apont. p. 560. No. **1064**.

Var. **albida** Oliv., *l.c.*, p. 159. *P. albidum* Engl. Bot. Jahrb. xvii. p. 83 (1893).

Huilla.—A cæspitose shrub of 1 ft., sometimes a small tree of 8 to 12 ft., widely branched; flowers white or whitish-rose; not uncommon in stony thickets and at the borders of woods throughout the plateau of Huilla, near Nene, Lopollo and Humpata; fl. and fr. Dec. 1859. No. **1065**. A shrub of 1 to 5 ft. (sometimes prostrate and only 6 in. high), loosely branched, erect; upper surface of the small *Vaccinium*-like leaves with deeply impressed venation; flowers white or rose-white; in shortly bushy pastures between Nene and Mumpulla; fl. Oct. 1859. No. **1066**.

The characters given by Engler, *l.c.*, to define his species, fail to correspond with all Welwitsch's specimens cited above; moreover Welw. No. 1064, quoted by Engler for it, does not belong to Oliver's variety *albida*.

3. **HARUNGANA** Lam. Tabl. t. 645 (1797); Benth. & Hook. f. Gen. Pl. i. p. 167 (*Haronga*).

1. **H. paniculata** Pers. Syn. ii. 91 (1807) (*Arungana*); *Haronga madagascariensis* Choisy; Oliv. Fl. Trop. Afr. i. p. 160.
Psorospermum (sp.) Welw. Synopse, p. 13, n. 27 (1862).

Sierra Leone.—A small tree of 8 ft. (probably a young tree), decussately branched, leaves coriaceous, glossy, flowers white, fruit brick-red, size of a pepper-corn; in the higher woods of Sugarloaf Mountain, near Freetown, fl. and fr. Sept. 1853. No. **5398**; fr., No. **5397**.

Golungo Alto.—A handsome tree, 20 to 80 ft. high (or in the secondary woods and thickets a shrub scarcely flowering), with the habit of *Laurus*; trunk straight, 1 to 2 ft. in diam.; wood compact, durable, abounding in a fine orange-red resin which stains paper with an orange colour; leaves evergreen, moderately coriaceous, above bright green glabrous minutely not pellucidly punctate, beneath covered with a very short appressed quasi-furfuraceous pale-cinnamon tomentum, the leaves of young plants often a foot long; flowers white or white-reddish, aromatic, rather small, pentamerous; drupes globose, scarcely half the size of pepper-corns, or when fully swollen and ripe scarcely the size of black pepper-corns, glossy-brown-yellowish, nearly dry: pyrenes 5, moderately crustaceous, 1- or more seeded; seeds ascending, obcuneate-cylindrical, somewhat compressed, brown, shining, minutely scrobiculate, one in each drupe almost always larger and better developed than the rest. Abundant in mountainous primitive woods of Serra de Alta Queta and of Mount Cungulungulo, fl. Jan. to March; Montalagre, 3 Feb. 1855; Alta Queta, 28 Feb. 1856. Native name "Mutune" or "Mutule"; the wood is called "Pao Mutûne" or "Mutûle." See Welw., *l.c*, and Apont. p. 560 under No. 140. No. **1063**. In fruit, No. **5399**.

A specimen from the Island of St. Thomas, where it is called "Sangue" or "Pao Sangue," probably belongs to this species; the leaves are, however, of the same pale tawny colour on both surfaces, and there are no flowers nor fruits; Dec. 1860. No. **5400**. See Henriques in Bol. Soc. Brot. x. p. 101.

4. **CAOPIA** Adans. Fam. Pl. ii. p. 448 (1763).
Vismia Vand. (1788); Benth. & Hook. f. Gen. Pl. i. p. 166.

1. **C. affinis** O. Kuntze, Rev. Gen. Pl. i. p. 58 (1891).
Vismia affinis Oliv. Fl. Trop. Afr. i. p. 161.

Golungo Alto.—A small tree, 12 to 15 ft. high, very frondose; leaves thinly coriaceous (chartaceous and marked with small round glands in the dry state), very caducous; flowers red outside, petals turning white. Rather rare, in the less dense woods of Sobato de Bumba and Bango, very sporadic; in the ascent to Capopa, in young fl. Dec. 1855. No. **1061***a*.

2. **C. frondosa** O. Kuntze, *l.c.*
Vismia frondosa Oliv., *l.c.*

Golungo Alto.—A small tree, widely frondose: branches spreading; leaves thinly coriaceous, glossy, marked with small round dark glands; flowers white. Sparingly, in wooded declivities near the ascent to the spring of Capopa, in fl. and young fr. Jan. 1856. No. **1062**.

XXI. GUTTIFERÆ.

These are stately evergreen trees, although few species reach a great height. *Symphonia globulifera* L. f. is one of the most beautiful trees of Upper Angola, on account of its deep-red flowers and shining leaves. The Guttiferæ appear very seldom to bear fruit; the only species which Welwitsch found with fruit is *Garcinia angolensis* Vesque. They have firm fine-grained wood, white and sometimes of a rose-red hue, and very durable, especially that of the latter species.

Welwitsch states that he saw a species of *Calophyllum* cultivated around Sierra Leone, at Freetown, but that it was not in flower, and the specimens of the leaves which he collected became rotten during his illness at sea.

1. **SYMPHONIA** L. f.; Benth. & Hook. f. Gen. Pl. i. p. 173.

1. **S. globulifera** L. f. Suppl. Sp. Pl. p. 302 (1781); Oliv. Fl. Trop. Afr. i. p. 163; Vesque in DC. Mon. Phan. viii. p. 227 (1893); var. **africana** Vesque, *l.c.*, p. 230 (1893).

Actinostigma speciosum Welw. Apont. p. 560, under n. 139. *Actinostigma* (sp.), Welw. Synopse p. 9, n. 12.

A tree with the habit of a laurel, copiously flowering, 15 to 35 ft. high, with trunk 1 to $1\frac{2}{3}$ ft. diam. near the base, exuding a yellow sap like drops of gum, patently branched; leaves coriaceous in the dry state, penninerved, not punctate, of an opaque dark-green colour and moderately glossy above, pale-green beneath; calyx ebracteolate, persistent, comprising 5 very obtuse imbricate segments; petals 5, inserted at the external base of the hypogynous disk, alternating with the calyx-segments, sinistrorsely or dextrorsely convolute in a globose form, loosely cohering even at the time of flowering, scarlet; disk elevated, cyathiform, thick, yellow, undivided; stamens combined in a scarlet tube at first cylindrical and soon ventricose at the base, inserted at the internal base of the disk; tube 5-lobed; lobes broad-linear, flat at the base, triquetrous at the apex, inclined on the sinuses of the stigma, each outside below the apex bearing 3 anthers; anthers linear, parallel, adnate, extrorse, 2-celled, biarsitate at the apex, scarlet; ovary included in the staminal tube, free, 5-celled; cells pluri-ovulate; style very short, thick, topped by a 5-radiate stigma, rays yellow, after the time of flowering stellate, patent, their sinuses occupied by the triquetrous segments of the staminal tube which are bent inwards towards the centre of the stigma. Fruit not seen though subsequently looked for.

Golungo Alto.—In warm spots of deep valleys in the primitive woods of Alta Queta, above N-delle (Undelle), fl. middle of April 1856. Native name "Mungundo." Sporadic. No. **1052**.

2. **PENTADESMA** Sabine; Benth. & Hook. f. Gen. Pl. i. p. 174.

1. **P. butyracea** Sabine in Trans. Hort. Soc. Lond. v. p. 457 (1824); Oliv., *l.c.*, p. 164; Vesque, *l.c.*, p. 247.

St. Thomas' Island.—Local name "Páo Ová," or "Obá." Probably collected in Dec. 1860. No. **6754**. Determination doubtful.

3. **GARCINIA** L.; Benth. & Hook. f. Gen. Pl. i. 174.

1. **G. angolensis** Vesque in DC. Mon. Phan. viii. p. 335.

Welwitsch states in his notes that this species furnishes good white and firm wood suitable for domestic utensils and agricultural implements, as well as for carving purposes; it is called "Unday falso." The following specimens appear to belong to it:—

Ambriz.—A small tree, 20 to 25 ft. high, much branched; branches branchlets and the shining coriaceous leaves all ternate. Flowers white, polypetalous. In the more elevated hilly thickets near Ambriz, with few flowers, middle of Nov. 1853. No. **5402**.

Libongo.—A small tree, 9 to 12 ft. high; branches elongate, ternate; flowers white. In the more elevated woods by the banks of the river Lifune; occasional, by no means common, ♂ fl. end of Sept. 1858. No. **1047**.

Bumbo.—A tree, 30 to 50 ft. high, with a corymbosely dilated crown. Sporadic in small woods comprising Combretaceæ, *Copaifera Mopane* Kirk, and *Tamarix orientalis* Forsk., near Quitive de Cima, in young fruit Oct. 1859 (with ripe fruit June 1860). No. **1048**.

2. **G. polyantha** Oliv. Fl. Trop. Afr. i. p. 166; Vesque, *l.c.*, p. 332.

Golungo Alto.—A small tree, 8 ft. high; branches elongate, patent, exhibiting a climbing tendency; leaves opposite, coriaceous, compact, glossy, pinnately veined. Sporadic in the primitive woods of Mangue, near Sange, at the base of the mountains of Serra de Alta Queta, without either flower or fruit, April 1885. No. **1046**.

There remains some doubt as to this determination; according to Welwitsch, Dr. Triana stated that the plant belonged to *Rheedia Pervillei* Planch. & Tr. (*G? Pervillei* Vesque, *l.c.*, p. 485).

3. **G. punctata** Oliv. Fl. Trop. Afr. i. p. 167; Vesque in DC. Mon. Phan. viii. p. 380 (1893).

Cf. *Dactylanthera*, gen. nov. Clusiacearum, Welw. Apont. p. 560, under n. 139, without description.

A tree, 15 to 25 ft. high, exuding a yellow sap; branches patent, slender, some nodding; branchlets opposite; leaves evergreen, decussate, rather coriaceous, rather glossy, pellucid-striate, darkish green above, rather paler beneath; ♂ flowers yellow, densely clustered in the axils of the leaves; calyx 4-parted, ebracteolate; segments concave, decussating, imbricate, the outer ones herbaceous on both sides and smaller, the inner ones herbaceous outside and coloured inside; petals 4, inserted on the fleshy torus, alternating with the sepals, free, imbricate in bud, very patent in full flower, milky, soon orange-red, fleshy, rather concave, fragile, obovate-oblong or spathulate, obtuse; stamens 4 (in 4 phalanges), inserted with and opposite to the petals; filaments ascending, thick, rigid, fleshy, flattened, at the apex uniformly dilated in a fan-like manner; anthers 5, seated on the reniform convex apex of each filament, therefore 20 altogether, adnate, 2-celled, longitudinally dehiscent; stigma sessile, broadly hemispherical, orange-coloured, oily-viscid.

Golungo Alto.—In dense very shady elevated woods of the mountains of Serra de Alta Queta, above Cahunha, in male flower beginning of Nov. 1855. No. **1050**.

4. **G. huillensis** Welw. ex Oliv. Fl. Trop. Afr. i. p. 167; Vesque in DC. Mon. Phan. viii. p. 353 (1893).

Huilla.—A small glabrous dicœcious tree, 7 to 10 ft. high, exuding from all parts a yellow resinous milk, oppositely branched, with a divaricately dilated crown; leaves opposite, coriaceous, rather glossy, with elevated veins on both surfaces, 2 to 3 by $\frac{3}{4}$ to $1\frac{3}{4}$ in.; petiole very short, clothed at the back with a bright red (glandular?) membrane, articulated with the branch; female flowers terminal and in the upper axils, subsessile, 1 to 4 together, herbaceous-green; calyx sessile amidst decussating bracts; uppermost bracts truncate, forming a minutely lobed or repand toriform epicalyx; sepals 4 in 2 decussating pairs, concave, rounded, imbricate; petals 4, rather larger than the sepals, sinistrorsely convolute (as seen from above), concave, rounded; rudiments of stamens 0 or few, minute, hypogynous; ovary superior, shortly ovoid, fleshy, vaguely and very obtusely 4-sided, 4-celled; cells 1-ovuled; style very short, thick, 4-furrowed; stigma peltate-hemispherical, much dilated, waxy, very viscid, with a small central depression above, shallowly 4-lobed. Sporadic, in the elevated woods of Morro de Lopollo, at an elevation of 5500 ft., ♀ fl. 17 May 1860. No. **1051**.

5. **Garcinia?** (sp.).

A glabrous scandent shrub, hard and rigid in all its parts, elegant, 5 to 8 ft. high; sap watery; branches terete; branchlets erect-patent, cylindrical, at the insertion of the leaves plano-compressed; leaves oval-oblong, abruptly and obtusely acuminate, rather wedge-shaped at the base, undulate-entire, thickly coriaceous, pellucid-punctate with small round dots, deep green above, pale green beneath, glossy on both surfaces, evergreen, 6 to 7 by $2\frac{1}{4}$ to 3 in.; petiole $\frac{1}{4}$ to $\frac{1}{3}$ in. long; buds of the flowers solitary in the axils of the leaves, subsessile, rose-coloured, caducous before fully open being destroyed by insects, thick, globular.

Golungo Alto.—Sporadic in dense primitive woods of Mata de Mangue and Prato de Mangue, at the base of the mountains of Serra de Alta Queta, in flower-bud in April, Nov. and Dec. 1855, and without fl. in March. No. **1049**.

Apparently dicœcious, with the female flowers solitary, and the male flowers a few together; there are not good buds extant on the specimens separated for the British Museum. It should be compared with the Bitter Cola (*G.* sp.), Journ. Bot. 1875, p. 65, t. 160 (*G. floribunda* Vesque, *l.c.*, p. 488).

XXII. DIPTEROCARPEÆ.

1. **MONOTES** Alph. DC. Prodr. xvi. ii. p. 623 (1868).

1. **M. africanus** Alph. DC., *l.c.*, p. 624.

Vatica africana Welw. ex Oliv. Fl. Trop. Afr. i. p. 173; Welw. Sert. Angol. p. 15, t. 5.

Var. *a.* **denudans**; *V. africana*, var. *laxa* Oliv., *l.c.*; *V. africana*, *a. denudans* Welw., *l.c.*, p. 16, t. 5, fig. 1.

Huilla.—Trunk $1\frac{1}{2}$ to 2 in. diam. Frequent in sandy bushy occasionally stony places, near the base of the Morro de Lopollo, fl. from Dec. 1859 to Jan. 1860, fr. April and May 1860. No. **1035**.

Var. β. **hypoleucus** ; *V. africana*, var. *hypoleuca* Oliv., *l.c.* ; Welw., *l.c.*, p. 17, t. 5, fig. 12 ; *V. hypoleuca* Welw., *l.c.*, p. 17.

Huilla.—Sparingly in the stony shorter woods between Mumpulla and Nene, in flower-bud Oct. 1859, in full flower Dec. 1859. No. **1036.**

The following is intermediate between α and β :—

A small tree, 6 to 8 ft. high ; trunk erect ; crown divaricate, lax ; flowers yellowish.

Huilla.—Sparingly in the higher wooded thickets of Proteaceæ between Lopollo and Monino, in flower-bud Nov. 1859, fl. Dec. 1859, in young fruit Jan. 1860. No. **1077.**

The following belongs to this species :—

Huilla.—A small tree, with simple leaves and the calyx-segments after flowering expanded into red rather rigid wings. Coll. Carp. 242.

XXIII. MALVACEÆ.

The Malvaceæ of Angola form one of the principal constituents of the herbaceous and shrubby vegetation of the country, and are fairly abundant in all regions from the coast up to 6000 ft. (in the highest regions and plateaux), but are most abundant between 1500 and 4000 ft. They contribute both by the beauty and variety of their leaves—and even more by the size and bright colouration of their striking large blossoms—very greatly to the adorning of the meadows and plains, the jungles, and the margins of the woods and cultivated places, and relieve the somewhat monotonous colour of the vegetation. The species decrease in number from Mossamedes and the high plateau of Huilla southwards.

Malvaceæ manage to subsist on many kinds of soil ; one and the same species is often seen to occur sometimes in dry hot sandy drifts, or in stony situations divested of other vegetation, and at other times in fertile situations on the margins of primitive forests or in inhabited districts on land previously cultivated ; the difference is that in poor ground the flowers are larger and more brilliant, while in rich ground there is more luxuriant development of stalks and foliage. The varying circumstances of soil and position exercise an important influence on the indumentum and render very difficult the discrimination of species and varieties, especially in the case of the genera *Sida*, *Abutilon*, etc.

The shape and size of the glands, which occur on the nerves of the leaves and calyx in several species of *Urena*, *Hibiscus*, *Gossypium*, etc., are very interesting, but they are too indefinite and variable on the same plants to afford characters for the diagnosis of species. In order to avoid errors, it must be remembered that many species with yellow flowers turn their corollas red in drying, and also that several species, especially of *Sida*, *Abutilon*, and *Hibiscus*, at the time of flowering, lose the long-stalked principal leaves of the main stem and retain only the very different younger leaves of the axillary shoots.

The native medical men employ several species as emollients in baths and gargles in the same way as they are used in Europe.

Other species, however, are beset with hairs containing an extremely irritating juice, which affect the skin in the same way as nettles, and even more so than the stinging species of *Mucuna*. Welwitsch observed that the stinging species of African Malvaceæ have always lobed leaves. The leaves of one or two species of *Hibiscus* afford an agreeable acidulous drink when boiled with salt, and produce a beneficial effect on the digestive organs of convalescents. A decoction made from the half-ripe fruits of *H. esculentus* is much appreciated even by the wealthy classes in Angola. The smoke of *Gossypium* ("Muginha" or "Muchinha"), when burnt over an open fire, is used as a remedy for headache.

A decoction of the roots of some small species of *Sida* is employed in cases of diarrhœa, usually mixed with Mubango (*Croton Mubango* Muell. Arg.).

1. **MALVA**, L.; Benth & Hook. f. Gen. Pl. i. p. 201.

1. **M. sylvestris** L. Sp. Pl. edit. 1, p. 689 (1753); forma **depauperata**.

Loanda.—A prostrate herb, with ascending branches and bluish-violet flowers pretty large for the style of plant; in sandy spots near Cacuaco, but not at all abundant, and perhaps introduced; fl. April 1854. No. **4904.**

2. **M. parviflora** L. Diss. Dem. Pl. Nov. nota f. in Amœn. Acad. iii. p. 416 (1756); Masters in Oliv. Fl. Trop. Afr. i. p. 177.

Pungo Andongo.—An annual or biennial herb, erect or ascending, branched from the base, 2 to 3 ft. high, somewhat hispid all over with stellate hairs; epicalyx 3-leaved; calyx 5-cleft; petals 5, narrowly obcordate, pale-violet, adnate by their short claws to the staminal tube, fugacious, scarcely longer or even shorter than the calyx; fruit depressed; carpels numerous, separating from the dilated central axis; abundant in waste previously cultivated spots and among crops of Indian corn and *Phaseolus*, within the fortress of Pungo Andongo; fl. and young fr. middle of Jan. 1857. No. **4903.**

Huilla. — Flowers pale violet-purple; in grassy places at the borders of the forest near Lopollo; fl. and fr. Feb. 1860. No. **4940.**

2. **SIDA** L.; Benth. & Hook. f. Gen. Pl. i. p. 203.

1. **S. spinosa** L. Sp. Pl. edit. 1, p. 683 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 180.

Loanda.—Fl. and fr. No. **4952***a*. A small erect very tough shrub, 1½ to 3 ft. high, with yellowish and also with whitish flowers; abundant in rather dry stations covered with short brushwood, between the city of Loanda and Quicuxe; fl. and fr. June 1858. No. **4959.**

Pungo Andongo.—A small shrub of 2 to 3 ft.; in open spaces and pastures about the city of Pungo Andongo, abundant; fl. and fr. Dec. 1856. No. **4961.**

2. **S. acuta** Burm. f. Fl. Ind. p. 147 (1768).

S. carpinifolia L. f. Suppl. Pl. p. 307 (1781); Masters, *l.c.*, part.

Sierra Leone.—No. **4968.**

Golungo Alto.—Roadway near Menha-Lula; fl. and fr. May 1855.

No. **4953.** A low shrub, with very patent branches and white *Cistus*-like flowers, with fugitive petals; in poor hot pastures, Sobato de Bumba; fl. and fr. Oct. 1855. No. **4962.**

Bumbo.—Serra da Xella; fl. and fr. Oct. 1859. No. **4949.**

3. **S. rhombifolia** L. Sp. Pl. edit. 1, p. 684; Masters, *l.c.*, p. 181.

Prince's Island.—Fl. and young fr. Sept. 1853. No. **4996** and (probably) No. **4957.**

Ambriz.—In forests of *Acacia*, from Ambriz towards Mubango; fl. and fr. Nov. 1853. No. **4954.**

Loanda.—A little shrub, 1 to 3 ft. high, mostly branched from the twisted base; rootstock thick, linear-conical, very long and tough, white, with a few lateral fibres; corolla orange-yellow, nearly $\frac{5}{12}$ in. diam.; petals contiguous to a considerable height, obcordate-cuneate; capsule depressed, umbonate at the apex, marked with 10 gibbosities and afterwards 10-sulcate, covered by the calyx and much exceeded by the sepals: abundant both in dry hilly and in low moist stations, and accordingly very variable in size and other characters; at Imbondeiro dos Lobos: fl. and fr. beginning of May 1858. No. **4951.** Also fl. and fr., Nos. **4952***b*, **4958.** Also a little shrub, 2 to 4 ft. high, with numerous stems from a woody rootstock, and virgately branched; flowers orange-yellow; abundant in thickets between the city of Loanda and Camana, especially about Maianga do Povo; fl. and fr. May 1858. No. **4960.**

Icolo e Bengo.—Near Foto, in argillaceous soils; fl. and fr. No. **4955.**

Golungo Alto.—Fl. and fr. Nos. **4924, 4956.**

Mossamedes.—In thickets at the banks of the river Bero, abundant, fl. July 1859. No. **4946.**

Huilla.—An annual herb of 10 in., with the habit almost of a *Byttneria*, with pale-yellow flowers; in thickets near Humpata, sporadic, fl. April 1860. No. **4947.**

4. **S. cordifolia** L. Sp. Pl. edit. 1, p. 684 (1753); Masters, *l.c.*, p. 181.

Ambriz.—In the forest round about Quibanza; fl. and immature fr. No. **4972.**

Loanda.—A lovely little shrub or rather a woody undershrub, $2\frac{1}{2}$ to 4 ft. high, much branched from the base; flowers white or whitish, soon turning yellowish, $\frac{1}{2}$ to $\frac{2}{3}$ in. diam. when expanded; in thinly bushy places between Bemposta and Camana, fl. and immature fr. May 1859. No. **4970.**

Golungo Alto.—Petals broadly obcordate, of a vinous-orange colour, striate within to the base with red-purple lines; in the low thickets in the drier declivities near Sange, end of Oct. 1855; cultivated as an ornamental plant, though scarcely deserving of such treatment. No. **4974** and Coll. Carp. 244. A herb, usually somewhat shrubby, with ashy-green leaves and with flowers white when fresh but quickly turning yellowish when dried; in bushy localities by roads and such-like places, near Sange, abundant; fl. beginning of Dec. 1855. No. **4975.** An undershrub or occasionally a little shrub, 2 to 4 ft. high, with the upper branches patent; flowers golden-yellow or paler; abundant by roadsides and about the villages of the natives, at Menha-Lula; fl. and fr. May 1856. No. **4973.** Fl. and fr., No. **4971.**

Pungo Andongo.—No. **4976.**

Huilla.—A little shrub, 3 ft. high, with yellow flowers; in the wild shrubby stations of Monino; April 1860. No. **4948.**

Cape de Verde Islands.—St. Iago; fl. and fr. Jan. 1861. No. **4977.**

5. **S. veronicæfolia** Lam. Encycl. Méth. i. p. 5, n. 11 (1783).
S. humilis Cav.; Masters, *l.c.*, p. 179.

Golungo Alto.—In palm plantations on the left bank of the river Cuango, near Sange, in exposed and also in somewhat shaded spots; fl. and fr. middle of July 1855. No. **4902**.

6. **S. urens** L. Syst., ed. 10, p. 1145 (1759); Masters, *l.c.*, p. 179.

Ambaca.—In grassy thickets at the bottom of the hill, near Caringa, fr. June 1855. No. **4966**.

Golungo Alto.—Very scarce in wooded places along the banks of the stream Delamboa, Sobado de Bumba, fl. March 1855. No. **4993**. Rather rare in cultivated plots of Indian corn, on the left bank of the river Cuango, fl. and fr. beginning of July 1855. No. **4991**. In palm groves on the left bank of the river Cuango, in the drier spots, fl. and fr. July 1855. No. **4992**. In hay-fields near Sange, in young fr. Nov. 1855. No. **4965**.

Bumbo.—Flowers of an Isabella-yellow colour; in wooded places at the base of the Serra da Xella, Bruco; fl. and fr. Oct. 1859. No. **4950**.

3. **WISSADULA** Medicus; Benth. & Hook. f. Gen. Pl. i. p. 204.

1. **W. rostrata** Hook. f. & Benth. in Hook. Niger Fl. p. 229 (1849); Masters in Oliv. Fl. Trop. Afr. i. p. 182.
Sida (sp.) Welw. Synopse p. 56 (1862); Ficalho, Pl. Ut. p. 96 (1884).

Golungo Alto.—An undershrub or herb, 3 to 5 ft. high, with orange-coloured flowers; in bushy places at the borders of the forest near Ponta de Luiz Simoẽs and Camilungo; fl. and fr. beginning of July 1855. No. **4908**. In places covered with tall bushes, near Undelle; fl. and fr. No. **4909**. An annual herb, usually somewhat shrubby, 3 to 5 ft. high, erect, with patent branches, and deep yellow almost orange-coloured flowers; abundant in bushy places at the borders of forests throughout the district; with flowers and both mature and immature fruits at the end of July 1856. No. **4910**. Between Trombeta and Cabondo; fl. and fr. Sept. 1854. No. **4911**.

This, which is known in Angola by the name of "Cahémbia-hémbia," grows abundantly throughout the interior of the country, and is commonly employed instead of the Mallow as a soothing decoction or bath. As this plant and various species of *Sida*, *Malache*, etc., much resemble one another, there is need for discrimination, since several of the latter possess pilose hairs which are set free in the process of infusion, and, when used internally, occasion some temporary irritation in the throat. (Welw. Synopse p. 56, n. 148.) Compare *Abutilon hirsutissimum* Moench, and *A. zanzibaricum* Bojer.

4. **ABUTILON** Gaertn.; Benth. & Hook. f. Gen. Pl. i. p. 204.

1. **A. intermedium** Hochst. ex Garcke in Schweinf. Beitr. Fl. Æthiop. p. 49 (1867).
A. angulatum Masters in Oliv. Fl. Trop. Afr. i. p. 183.

Ambriz.—Quisembo, fl. and fr. No. **4980**. (The specimen under this number in the Kew herbarium appears to belong to a different species.)

Libongo.—A shrub, 6 to 8 ft. high, almost making a small tree, but wholly herbaceous, including a stem of 1 in. in diameter, branched in a pyramidal form; branches patent; leaves glaucous-velvety, very soft, not coriaceous; flowers orange-yellow; abundant in moist bushy

stations along the left bank of the river Lifune, near Barra de Libongo; fl. and fr. Sept. 1858. No. **4978.**

Icolo e Bengo.—In argillaceous soils, near Foto; fl. and fr. No. **4979.**

Loanda.—An undershrub, with glaucous-tomentose tiliaceous foliage, and orange-coloured flowers; in dry bushy stations near the city of Loanda; Oct. 1853. Coll. Carp. 243.

2. **A. hirsutissimum** Moench, Suppl. Meth. Pl. p. 205 (1802).
A. asiaticum Sweet; Masters, *l.c.*, p. 184.

Golungo Alto.—Represas do Mel. Pereira, Feb. A somewhat shrubby herb, 3 to 5 ft. high, erect, patently branched; flowers orange-yellow; the leaves are collected for a mallow-decoction; abundant in bushy places and about dwellings; Camutamba, fl. and fr. Sept. 1857. No. **4984.** An undershrub of 4 to 6 ft. in height, called Mallow by the Portuguese colonists, and employed for emollient decoctions; abundant throughout the district by bushy places; July 1858. Coll. Carp. 246.

Compare Welw. Synopse, p. 56, n. 148.

3. **A. glaucum** Sweet, Hort. Brit. ed. 1, part i. p. 54 (1826); Masters, *l.c.*, p. 185.

Cape de Verde Islands.—Near rocks in the Island of St. Vincent, without fl. or fr. Sept. 1853. No. **4963.** Apparently this species.

4. **A. zanzibaricum** Bojer ex Masters, *l.c.*, p. 186; vel affine.

Golungo Alto.—A herb, 4 to 6 ft. high, at length usually becoming woody at the base, with golden-coloured fugacious rather large flowers; fl. and fr. May 1855, from Calolo to Camilungo. It flowers there nearly throughout the year. The natives call it "Capianeca," and the colonists call it Mallow, and employ its leaves in a decoction as an emollient bath. Compare Welw. Synopse, p. 56, n. 148. No. **4983.** Fl. and fr. No. **4920.**

5. **A. ramosum** Guill. & Perr. Fl. Senegamb. Tent. p. 68 (1830—1831); Masters, *l.c.*, p. 186.

Golungo Alto.—An undershrub, 3 to 4 ft. high, with yellow flowers; by thickets in Sobato de Mussengue, rather rare; fl. and fr. May 1855. No. **4985.** A diffusely branched herb of 2 to 3½ ft.; flowers yellow, almost of the colour of yolk of egg, small, fugacious; petals broadly obovate, repand-denticulate towards the apex; in rather dry bushy stations by the road towards Quibixe, Sobato de Bumba, not abundant; fl. and ripe fr. beginning of June 1856. No. **4986.** Somewhat shrubby, 3 to 4 ft. high; leaves soft, employed for decoctions after the manner of mallow; flowers yellow; only a few specimens seen; June 1856. Coll. Carp. 245.

Compare Welw. Synopse, p. 56, n. 148.

6. **A. elongatum** Moench, Suppl. Meth. Pl. p. 205 (1802).
A. indicum Sweet; Masters, *l.c.*, p. 186; vel affine.

Golungo Alto.—Everywhere abundant in bushy places, especially about native villages; fl. and fr. beginning of August 1855. Specimens met with in winter—that is, in July and August. No. **4969.** Also in fruit. No. **4982.**

Var. **Welwitschii** (*A. indicum* Sweet, var. *Welwitschii* E. G. Baker in Journ. Bot. 1893, p. 213).

Mossamedes.—An undershrub, woody at base, 4 to 5 ft. high, with deep orange-coloured flowers; Cavalheiros, fl. Aug. 1859. No. **4944**.

The following No. is doubtfully placed under this species:—

Mossamedes.—A somewhat shrubby herb, 3 to 3½ ft. high, branched from the base, with soft rather flaccid glaucous-tomentellous foliage and white flowers; in thickets near the river Bero, sparingly; fl. July 1859. No. **4945**.

7. **A. fruticosum** Guill. & Perr., Fl. Senegamb. Tent. p. 73 (1830—1831); Masters, *l.c.*, p. 187.

Loanda.—A little erect shrub, 3 to 4 ft. high, much branched, with white tomentose leaves and deep-yellow flowers; in moist stations covered with low brushwood near Bemposta, sparingly; fl. and fr. July 1858. No. **4967**. Also fl. and fr., No. **4981**.

5. **URENA** L.; Benth. & Hook. f. Gen. Pl. i. p. 205.

1. **U. lobata**, L. Sp. Pl. edit. 1, p. 692 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 189.

Var. **reticulata** Gürke in Engl. Bot. Jahrb. xvi. p. 376 (1893).

Sierra Leone.—No. **4913**.

Prince's Island.—Fr. Sept. 1853. No. **4914**.

Ambriz.—An undershrub 2 to 4 ft. high, woody at base, sparingly and patently branched; flowers rose-purplish; the inner bark is everywhere used for the manufacture of ropes; in hilly and bushy stations near Mubango in the Ambriz territory; fl. and fr. Nov. 1853; native name "Quibosa c'ofele." No. **4917**.

Golungo Alto.—In exposed places, among beds of *Imperata arundinacea* Cyr. ("Senu"), near Sange, in fruit, Dec. 1854. No. **4915**. An undershrub, 2 to 4 ft. or higher; the stems afford sufficiently tough fibres for the manufacture of ropes; abundant in the lower thickets, especially on the drier hills, near Sange and at Ponte de Luiz Simoës; fl. and fr. July 1855; native name "Caquibosa," "Cajbosa," or perhaps better, "Ca-Nbosa." No. **4918**. In cultivated places an undershrub, and in aboriginal thickets a shrub of 3 to 4 ft., branched in a divaricate manner; the inner bark is very tough, and used for the manufacture of ropes; foliage varying in shape and indumentum according to the station and age of the plant; flowers violet-purple, very quickly withering; abundant, by wooded thickets and about native villages, almost everywhere; fl. and fr. almost throughout the year; Sange, 7 May 1856; native name "Caquibosa." No. **4912**. Fr. end of Sept. 1856. Coll. Carp. 2. A shrub, 3 to 4 ft. high, the branches furnish good fibre for the manufacture of string; Sobado de Bumbo, Sept. 1856. Coll. Carp. 9*b*. An undershrub, 2 to 4 ft. high; fibre of the branches very tough; seeds forwarded to Welwitsch in 1859. Coll. Carp. 247.

Pungo Andongo.—An undershrub, 4 ft. high, with numerous branches; in secondary thickets, near Quitage, not abundant; fl. and fr. March 1857. No. **4916**.

6. **MALACHE** B.C. Vogel in Trew, Pl. Sel. Ehret, Dec. viii. p. 50, t. 90 (1772). *Pavonia* Cav. (1786); Benth. & Hook. f. Gen. Pl. i. p. 205.

1. **M. macrophylla** O. Kuntze, Rev. Gen. i. p. 70 (1891).

Pavonia macrophylla E. Mey.; Mast. in Oliv. Fl. Trop. Afr. i. p. 190.

Pungo Andongo.—Fl. and fr. No. **4987**.

Huilla.—In the grassy parts of Monino, scattered among shrubs and trees; fl. wine-yellow, also in fr. Dec. 1859. No. **4926**. Near Eme, at the skirts of the forest composed of "Panda" (*Berlinia paniculata* Benth., *Brachystegia spicæformis* Benth., etc.); fl. wine-yellow, also in fr. beginning of Jan. 1860. No. **4925**.

2. **M. hirsuta** O. Kuntze, *l.c.*

Pavonia hirsuta Guill. & Perr.; Masters, *l.c.*, p. 191.

Mossamedes.—A herb, 3 to 4 ft. high; flowers ($1\frac{2}{5}$ in. long) of a straw-yellow colour, inside purple at the base; calyx $\frac{1}{2}$ in. long; in thickets alongside the banks of the river Bero; fl. and fr. July 1859. No. **4935**.

3. **M. Schimperiana** O. Kuntze, *l.c.*, p. 71.

Pavonia Schimperiana Hochst.; Masters, *l.c.*, p. 192.

Var. **obtusiloba**. Leaves clothed with short hairs on both surfaces and on the lower paler surface also with longer hairs; lobes broad, mostly obtuse.

Golungo Alto.—An undershrub, 3 to 4 ft. high, or rarely higher, branched throughout from the base to the apex; leaves broad, 5-lobed, pellucid-punctate, the older ones pendulous; flowers white, rather large, quickly withering; calyx rather deeply 5-dentate than 5-cleft, campanulate, teeth triangular, valvate in æstivation; carpels 5, obovoid-trigonous, with 3 long awns at the apex, awns barbed with reflexed prickles; not abundant, at the shaded margins of streams in wooded places, by the road to Mussengue-Quiapoze; fl. and fr. end of June 1855. No. **4906**. An undershrub, woody at base, 3 to 4 ft. high, branched, with white flowers; in the rather moist wooded parts of Mata de Quisuculo, sporadic, fl. April 1856. No. **4907**. An undershrub, with the habit of *Urena*, 3 to 4 ft. high, branched, with large lobed leaves shaped like those of *Hibiscus*, and rather large white flowers; at the margin of Quiapoze, by the road to Mussengue, June 1856. Coll. Carp. 248.

Mossamedes.—A much-branched herb, 4 ft. high; amidst shrubs near the river Maiombo; fr. June 1860. No. **4941**.

7. **KOSTELETSKYA** Presl.; Benth. & Hook. f. Gen. Pl. i. p. 206.

1. **K. Büttneri** Gürke in Verh. Bot. Brand. xxxi. p. 92 (1889).

Pungo Andongo.—By the river Cuanza at Sansamanda; fl. and fr. Feb. 1857. No. **4900**. Mr. E. G. Baker, in Journ. Linn. Soc. vol. xxx. p. 74 (1894), considered this as probably a stouter form of his *K. flava* there described.

8. **HIBISCUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 207.

1. **H. vitifolius** L. Sp. Pl. edit. 1, p. 696 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 197.

Loanda.—Fl. and fr. No. **5236**. A herb; stem 2 to 4 ft. high, diffuse; branches and leaves stinging-hispid; flowers of moderate size, petals of a deep-sulphur colour, atro-sanguineous on the inside from the base almost to the middle; capsule broadly 5-winged; in thickets near Alto das Cruzes, rather rare; fl. and fr. middle of March 1858. No. **5239** and Coll. Carp. 256.

Pungo Andongo.—Cabondo; fl. and fr. April 1857. No. **5246**.

Mossamedes.—A herb, 3 to 4 or sometimes 5 ft. high; stems branched; leaves various in shape; in thickets near the banks of the river Bero; fl. and fr. July 1859. No. **4932**.

2. **H. intermedius** A. Rich. Tent. Fl. Abyss. i. p. 58 (1847); Masters, *l.c.*, p. 198.

Loanda.—Not common, in the bushy and drier parts of the district, towards the east, as for instance at Penedo and Boa Vista; fl. and fr. April 1854. No. **5273**. An annual herb; rather rare in the low-lying and somewhat moist thickets, near Imbondeiro dos Lobos; fr. beginning of May 1858. No. **5272**.

Welwitsch's specimens appear to belong to this species.

3. **H. Mechowii** Garcke in Linnæa xliii. p. 121 (1881-1882).

The following number may belong to this species; but I have not seen the type:—

Pungo Andongo.—A herb, annual or the stem becoming woody at the base, biennial; flowers large (about 2 in. long in the dry state), sulphur-coloured, inside at the base purple-velvety; abundant in secondary thickets, between Caghuy and Calunga; fl. and immature fr. end of April 1857. No. **5262**.

4. **H. physaloides** Guill. & Perr. Fl. Senegamb. Tent. p. 52 (1830-1831); Masters, *l.c.*, p. 199.

Golungo Alto.—A cinereous undershrub, 2 to 3½ ft. high, clothed with rigid very stinging hairs, remarkable for whitish glands placed at the insertion of the petiole in the axils of the primary nerves; petals 1½ in. long, spathulate, entire, sulphur-coloured, marked at the base inside with an oblong orange-scarlet or vermilion spot, fugacious; in elevated bushy pastures, Sobato da Bumba; fl. and fr. May and Oct. 1855. Nos. **5245**, **5247**. Sobato de Mussengue; fl. and fr. June 1856. No. **5248**. No. **4922** (no locality).

The two following numbers, represented in the British Museum set each by a fragment and a sketch of the unique specimen in the study set, should be compared with this species, but they appear different:—

Huilla.—An erect simple slender annual herb, a foot high, pallid; Lopollo, fr. No. **4929**. In rather dry bushy stations, near Lopollo, Oct. 1859, fl. 1¾ in. long. No. **4933**.

5. **H. loandensis** Hiern, sp. n.

An erect undershrub of 5 to 6 ft. or a shrubby herb, with patent subterete branches, and the stem branches and foliage beset with rigid stinging hairs; branchlets thinly leafy. Leaves (of the branchlets) more or less 3-lobed or occasionally undivided, broadly ovate, cordate at base, membranous, green and thinly scattered with stellate and more thickly spread with short appressed hairs above, rather paler and thinly scattered with impressed glands and stellate hairs beneath, 1¼ to 4 in. long and broad, crenate-serrate; lobes ovate or ovate-lanceolate, the middle one the longest, usually about two-thirds of the length of the leaf; petiole 1 to 3½ in. long, often longer than the lamina, pubescent; stipules subulate, ¼ in. long. Flowers axillary, solitary or congested at the extremities of the branchlets; peduncles ½ to 1¼ in. long, ascending, jointed near the top, pilose; epicalyx consisting of about 15 filiform pilose segments, about half as long as the fruit; calyx divided rather more than half-way down into 5 ovate-

lanceolate acute pilose lobes nearly or quite equalling the fruit; petals oval, of moderate size, $1\frac{1}{4}$ in. long, sulphur-yellow, with a dark-purple spot at the base; staminal column $\frac{2}{3}$ in. long; fruit $\frac{5}{8}$ to $\frac{3}{4}$ in. long; carpels hairy outside, narrowed at the apex into a strong apiculus; seeds tubercled, not cottony.

Loanda.—In shrubby stations near Maiango do Povo; fl. and fr. March 1858, rather rare. No. **5240** and Coll. Carp. 255.

Barra do Dande.—Among tall herbs, by the marshy banks of the river Dande, near Bombo, rather rare; fl. and fr. Sept. 1858. No. **5249.**

This and the following species belong to the section Ketmia, and stand near *H. physaloides* G. & P.

The following No. may belong here; it differs from the type by its leaves being unlobed or nearly so:—

Benguella.—In sandy bushy stations between the city of Benguella and the river Catumbella, rather scarce; fl. (about $1\frac{1}{4}$ in. long) and fr. June 1859. No. **4934.**

6. **H. andongensis** Hiern, sp. n.

An erect herb, 3 ft. high, beset on its stem and foliage with hispid violently stinging hairs; stem branched, terete; branchlets tomentose and hispid. Leaves (of the branchlets) deeply palmati-lobed, almost like *Cannabis*, cordate at the base, thinly membranous, dark-green and scattered with stellate forked and simple hairs above, paler glandular and scattered with stellate forked and simple hairs beneath (but without white prominent glands in the axils of the primary nerves); lobes 3 to 7, mostly oblanceolate, serrate-dentate or incise-lobulate, $1\frac{1}{2}$ to 4 in. long, $\frac{1}{2}$ to $1\frac{1}{4}$ in. broad, acute at the apex, all except the basal ones more or less wedge-shaped at the base, the terminal one rather the longest and the basal ones shortest; petiole equalling or longer than the lamina, $1\frac{1}{2}$ to 6 in. long; stipules filiform, $\frac{1}{5}$ in. long. Flowers axillary and solitary or congested in quasi-terminal clusters; peduncle 1 in. long more or less, densely pilose-hispid, jointed near the top; epicalyx consisting of about 15 filiform pilose-hispid segments about half as long as the fruit-calyx; calyx in fruit deeply 5-lobed, pilose outside, about 1 in. long, lobes ovate-lanceolate, acute, $\frac{3}{4}$ in. long; fruit slightly nodding, about equalling the calyx, pilose outside, carpels prolonged into an acute apex; seeds tubercled, not cottony.

Pungo Andongo.—In the stony wooded parts of Mata de Pungo; sporadic; fr. middle of April 1857. No. **5257.**

7. **H. rhabdotospermus** Garcke in Bot. Zeit. vii. p. 839 (1849); Masters, *l.c.*, p. 200; var. **mossamedensis.**

An erect or ascending annual herb, 1 to 3 ft. high, or occasionally when growing amidst shrubs taller, somewhat branched. Branches terete, rather slender, clothed with short hairs and scattered with longer stellate hairs, pallid, not prickly. Leaves ovate, acute at the apex, rounded or somewhat narrower at the base, membranous, crenate-serrate except near the base, not lobed, with a few scattered hairs on both surfaces, dark green above,

rather paler and with a few brown depressed points (glands?) chiefly between nerves at the base beneath, $1\frac{1}{2}$ to $3\frac{1}{4}$ in. long, $\frac{1}{2}$ to $1\frac{3}{4}$ in. broad; petiole $1\frac{1}{4}$ to 3 in. long, pubescent; stipules filiform, short, hairy. Flowers axillary and solitary, or clustered at the extremities of the branches; peduncles ranging up to 1 in., pubescent, indistinctly jointed near the apex. Epicalyx pubescent, consisting of 10 entire curving filiform or narrow and tapering separate segments about $\frac{1}{2}$ in. long, more or less patent in fruit. Calyx hispid-pubescent, $\frac{2}{3}$ to $\frac{7}{8}$ in. long, deeply 5-lobed, exceeding the fruit, not ventricose in fruit; lobes ovate-attenuate, long-pointed, $\frac{1}{2}$ to $\frac{5}{8}$ in. long. Petals yellow, but little exceeding the calyx, somewhat pubescent outside. Fruit pubescent; carpels 5, prolonged at the apex into a long beak, ciliate along the lines of dehiscence. Seeds tuberculate, not cottony.

Mossamedes.—In sandy stations at the banks of the river Bero, rather rare; fl. and fr. August 1859, June 1860. Nos. **4936**, **4937**.

Perhaps a distinct species, differing from that of Garcke by not cordate leaves, etc.

8. **H. surattensis** L. Sp. Pl., edit. 1, p. 696; Masters, *l.c.*, p. 201.

Loanda.—No. **5254**.

Golungo Alto.—In palm-plantations near the river Cuango, fl. and fr. May 1856. Nos. **4921**, **5255**.

Pungo Andongo.—Fl. May 1857. No. **5253**.

9. **H. Mastersianus** Hiern.

H. furcatus Masters, *l.c.*, p. 201, non Roxb.

Pungo Andongo.—Flowers deep yellow, somewhat veined, rather small for the genus (about $\frac{3}{4}$ in. long); in secondary thickets near Caghuy; fl. and fr. May 1857 (seeds slightly and sparingly papillose). No. **5242**.

Huilla.—In thickets near Ferraõ da Sola in the Lopollo country: flowers yellow (1 in. long); fl. Jan. 1860. No. **4927**. Flowers yellow (1 in. long); in stony bushy places at the borders of forests consisting of "Panda" (*Berlinia paniculata* Benth., *Brachystegia spicæformis* Benth., etc.), near Eme; fl. May 1860. No. **4928**.

These specimens differ from *H. furcatus* by the shortness of the peduncles, which do not exceed $\frac{1}{6}$ in. in length. The following No. further differs by the short peduncles being not always solitary and often arranged in terminal leafy spicate racemes or in small axillary leafy cymes; the seeds glabrous smooth and shining; it may perhaps constitute a separate species:—

Pungo Andongo.—An undershrub, 3 to 5 ft. high, patently branched: flowers of moderate size (1 to $1\frac{1}{2}$ in. long), of a straw-yellow colour; in thickets alongside the rivulets of the fortress of Pungo Andongo, near Cazella, April 1857; also Calunda-Mangue; fl. and fr. No. **5241**.

10. **H. rostellatus** Guill. & Perr. Fl. Senegamb. Tent. p. 55; Masters, *l.c.*, p. 201.

Pungo Andongo.—An undershrub, 5 to 8 ft. high, armed with rigid very stinging hairs; flowers of a sulphur colour, marked with purple inside near the base, large; in moist thickets at the banks of the river Miége to the south of the city of Pungo Andongo; fl. No. **5243**.

11. **H. lunarifolius** Willd. Sp. Pl. iii. p. 811 (1800); Masters, *l.c.*, p. 202.

Cazengo.—Caculo, fl. and fr. June 1855. This resembles the type of *H. guineensis* G. Don. No. **5252**.

Pungo Andongo.—A shrubby herb, 5 to 6 ft. high, patently branched, with irritating hairs; flowers very large (2½ in. long in the dry state), of a sulphur-wine colour; in wooded stations of Mata de Pungo, May 1857. No. **5251**.

Huilla.—Flowers of a brilliant sulphur colour, very large (2½ in. long in the dry state); in moist shrubby stations on the left bank of stream Catumba; fl. and fr. end of April 1860. This resembles *H. dongolensis* Delile. No. **4939**.

12. **H. calyphyllus** Cav. Diss. v. p. 283, tab. cxl. (1788); *H. calycinus* Willd. (1840), Masters, *l.c.*, p. 202; vel affinis.

Golungo Alto.—An erect herb, 3 to 4 ft. high, not abundant, in shaded stations at the cataracts of the river Cuango, and more rarely on the right bank of the river Delamboa, in thickets; fr. August 1855; also an erect herb, 4 to 5 ft. high, sparingly branched, in the wooded thickets of Quisuculo, near Bango; fl. May 1856. No. **5238**. A shrub, 5 to 8 ft. high; producing many long slender straight and nearly erect stems, and slender rather spreading tough branches, apparently adapted for the manufacture of string; flowers yellow, marked inside near the base with dark purple; calyx and epicalyx pentamerous; capsule conical-pyramidal, acuminate, 5-valved; seeds numerous, reniform, densely and shortly hirsute; fr. Sept. 1855; native name "Quibosa ca-iála" (macho da Quibosa). No. **4919**. By road leading to Bango, July 1856; a textile plant. Coll. Carp. 367.

Zenza do Golungo.—A shrubby herb; leaves poplar-like; fruit-peduncles ½ in. long; segments of the epicalyx several; capsules ovoid-pyramidal, of 5 woody pointed carpels 1¼ in. long; in thickets near Quicanda; fr. Sept. 1854. Very doubtfully referred to this species. No. **4898**.

Pungo Andongo.—Flowers (in the dry state) ranging up to 2¼ in. long; Lombe. The tail-like tips of the segments of the epicalyx resemble those of *H. subtrilobatus* Hochst. n. 2319; this Masters unites with *H. calyphyllus*, to which the specimens of Welwitsch are doubtfully referred, and from which the fruiting specimens differ by the long carpels exceeding the calyx and epicalyx. No. **5244**. Flowers patent-drooping, nearly 2 in. long (in the dry state); segments of the epicalyx spathulate-lanceolate, entire. Possibly belongs here. No. **5250**.

13. **H. panduræformis** Burm. f. Fl. Ind. p. 151, t. 47, f. 2 (1768); Masters, *l.c.* (*panduriformis*), p. 203.

Icolo e Bengo.—A hoary erect herb, 2 to 3 ft. high, with yellow flowers, small for the genus; in swamps about Lagôa da Funda; fl. and fr. Sept. 1857. No. **4896**. An undershrub, 5 ft. high, patently branched; leaves silky-tomentose, flowers yellow at the margin; in bushy places by the king's highway, near Funda; Sept. (seeds tomentose). Coll. Carp. 257.

Loanda.—In young flower-bud Feb. 1859. No. **4895**. An undershrub, 5 to 8 ft. high, with numerous stems; flowers of a deep-sulphur colour, marked inside at the base with dark purple (1¼ in. long when dry); not infrequent; May 1854. No. **4894**.

14. **H. cannabinus** L. Syst. Nat. ed. 10, ii. p. 1149 (1759); Masters, *l.c.*, p. 204; vel affinis.

Loanda.—Quicuxe, fr. July 1854. No. **5265**. A shrubby annual, 3 ft. high; leaves edible; capsules in old age turning a beautiful purple colour; Quicuxe, August 1854. Coll. Carp. 104.

Golungo Alto.—An annual erect branched herb; flowers yellow, marked inside at the base with dark-purple; by the road leading to Mussengue, amongst tall grasses; fl. May 1855. No. **5263**. Corolla wine-white, petals marked at the base inside with a large purple spot; Luis do Pereira, fl. and fr. May 1855. Nos. **5259**, **5260**. 3 to 5 ft. high; lower leaves lobed, the uppermost ones lanceolate-linear elongated; flowers congested; calyx-lobes densely beset with red glands; Mussengue road, June 1856. Coll. Carp. 254. A perennial herb, a foot higher or more, strictly erect; calyx decked with prickly red glands; corolla rather large, of a violet-sulphur colour variegated with dark-purple at the base; rather rare, in the wooded thickets of Quisuculo, Sobato de Bango, fl. and fr. May 1856. No. **5258**. Coll. Carp. 253. Flowers of a sulphur colour, marked inside with a purple spot; fl. and young fr. end of June 1855. No. **5264**.

Cazengo.—Fr. June 1855. Nos. **5261**, **5268**.

Ambaca.—A herb, 2 to 3 ft. high; foliage apparently edible; flowers of a sulphur colour, marked inside at the base with dark-purple; near Ngombe, in plantations of Manihot; fl. and fr. Oct. 1856. No. **5267**.

Pungo Andongo.—An erect herb, usually shrubby and with ascending branches at the base, 3 or occasionally 4 ft. high; foliage edible, with an agreeable acid taste; flowers yellow, pretty large: not uncommon in secondary thickets by the banks of the river Miége, within the fortress of Pungo Andongo; fl. and immature fr. middle of April 1857; called by the natives "Husa." Nos. **5266**, **5269**, **5274**. Lula dacaranga; in fruit; (leaves undivided or 3-lobed, 2½ in. long, 2 in. broad; petiole 2¾ in. long). No. **4994**.

Mossamedes.—In sandy thickets near the river Bero, sporadic and rare; in late fl. and immature fr. beginning of August 1859; (leaves 3 to 4-lobed in a digitate manner, blade ranging up to 1½ in. long, flowers apparently longer). No. **4931**.

Huilla.—Flowers sulphur-coloured, inside with a purple spot (1⅓ in. long, when dry); in grassy sparsely shrubby stations, at the Banca de Lopollo; in late fl. and fr. April 1860. No. **4938**.

Several of the specimens enumerated above under this species are doubtfully placed here, and must be compared with the next.

15. **H. Acetosella** Welw. ex Fic. in Bol. Soc. Geogr. Lisb., Ser. 2, p. 608.

H. Sabdariffa Fic. Pl. Ut. p. 97 (1884), non L.

A biennial or triennial or rarely an annual herb or a somewhat shrubby perennial plant, glabrous in most parts; branches spreading, smooth, terete or towards the extremities somewhat angular in the dry state. Leaves broadly ovate, 3 to 5-lobed or undivided, scarcely narrowed, not deeply cordate at base, ranging up to 3 in. in length and breadth, rather fleshy, glaucous and acid; lobes deep or shallow, crenate-dentate; petioles as long as or longer than the blade, ranging up to 4 in. in length; stipules linear-spathulate, ½ in. long, acute, glabrous. Flowers axillary, subsessile, often crowded in short axillary leafy branches, rather large, yellow but marked with a red spot near the base on the inside. Segments of the epicalyx 10, combined at the base, linear, sometimes forked at the apex, somewhat hispid or glabrate, about

as long as the calyx in flower or half as long as it in fruit. Calyx divided about half way down in flower or two-thirds down in fruit, hispid or glabrate; lobes ovate, prolonged in fruit. Fruit ½ to ¾ in. long, pilose outside; carpels pointed; seeds papillose, not cottony.

Golungo Alto.—In stations clothed with short brushwood, alongside roads, also in neglected fields, and occasionally cultivated by the natives; Varzea do Isidoro, in flower-bud in March 1856, and in May 1855 in fl. near Mussengue. No. **5270.** At the moist borders of thickets between Sange and Zanga, fr. Dec. 1854; and in open wooded places on the lower mountains of Queta, Oct. 1855. No. **5271.** By fences and thickets near Sange, in seed Dec. 1854. Coll. Carp. 249, 250, 252.

The leaves have an agreeable acidity, on which account the Portuguese colonists call the plant "Azedas" (sorrel); they are of easy digestion and are prepared by the inhabitants after the manner of *Rumex Acetosella*, affording an excellent restorative remedy to invalids after the climatic fevers. This bears much resemblance to *H. cannabinus* L., but is destitute of aculeate tubercles, and has the character of the section Furcaria. It is called by the natives of Golungo Alto "Husa," as is also a plant mentioned under *H. cannabinus* L. in Pungo Andongo. Welwitsch in *Apontamentos*, p. 558, stated that a species of *Hibiscus*, hitherto undescribed and called "Husa" by the negroes, is cultivated as greens, having a taste similar to sorrel.

16. **H. micranthus** L. f. Suppl. p. 308 (1781); Masters, *l.c.*, p. 205. *Bombycella bicolor* Welw. Apontamentos, pp. 558, 589.

Loanda and Dande.—An undershrub, 2 to 3 ft. high, erect; branches again branched towards the apex; pubescence finely stellate; flowers of a whitish-rose colour, very elegant, nodding; abundant in thickets near the city of Loanda, and also in rather dry hilly stations near the river Dande; fl. and fr. Nov. 1853 and Jan. 1854. No. **4989.** An undershrub with rod-like stems, oblong leaves, and milkwhite flowers; a plant quite deserving cultivation. Coll. Carp. 267. A herb or undershrub of 2 to 4 ft., woody at base; flowers nodding, delightfully two-coloured, whitish at the base and from the middle to the apex rose-purple, in the dry season rather small, but in the rainy season much larger; abundant on bushy hills, with rather large flowers Dec. 1853, and with small flowers in flooded stations near Imbondeiro dos Lobos, March 1858; also in fruit. No. **4988.** An erect undershrub, 2 to 3 ft. high, in groves of *Hyphæne benguellensis* Welw., Praia S. Thiago, Feb. and Sept. 1858. Coll. Carp. 266. A shrub, 6 ft. high, with the habit of a *Sida*; flowers of a fine purple colour; in stations with weak and low bushes, near Calucala, rare, fl. and fr. Sept. 1854. No. **4897.**

17. **H. Solandra** L'Herit. Stirp. Nov. i. p. 103 t. 49 (1785); Masters, *l.c.*, p. 206.

Golungo Alto.—An annual erect herb, 1½ ft. high, divaricately branched near the base; lower leaves cordiform, the middle ones with 3 or more lobes, and the uppermost ones more or less lanceolate; flowers white, very fugacious; petals concrete to a considerable height with the staminal tube, convolute in the bud and soon after the opening of the flower; anthers reniform, versatile, subsessile; style-branches 5; stigmas capitellate-penicillate; capsule 5-celled, loculicidal; valves 5, seminiferous along the middle and also along the septum, when dehiscent exposing almost to the base a central column;

in no small quantity but seen only in one place, in beds of Manihot, on the left-hand side of the road leading to Ambaca, near Matas de Quibanga ; fl. and immature fr. beginning of July 1856. No. **4990.**

18. **H. esculentus** L. Sp. Pl., edit. 1, p. 696 (1753) ; Masters, *l.c.*, Welw. Apont. p. 558 (*Abelmoschus esculentus*).

Loanda.—An annual herb, 3 to 5 ft. high ; stem erect, thick and succulent, branched ; flowers large, sulphur-coloured, inside near the base purple ; fruit edible ; abundant, both wild and cultivated, on plains and in fields throughout Angola ; Imbondeiro dos Lobos, fl. Dec. 1858. No. **5278.**

Golungo Alto.—A sparingly branched herb, sometimes rather woody at the base, 4 or even 5 ft. high ; flowers handsome, large, sulphur-coloured inside purple at the base, but soon withering ; wild, perhaps an escape from cultivation, almost ubiquitous, in bushy places, Bango, fl. April 1856 ; native names "Quingombo" and "Quiabos." No. **5277.** Coll. Carp. 251.

19. **H. Abelmoschus** L. Sp. Pl. edit. 1, p. 696 (1753) ; Masters in Oliv. Fl. Trop. Afr. i. p. 207.

Golungo Alto.—Flowers large, yellow ; petals inside near the base dark-purple ; at the borders of forests, Sobato Mussengue, fl. beginning of Oct. 1855. No. **5276.** A herb, 3 to 4 ft. high ; flowers very large, sulphur-coloured, with a dark-purple spot near the base inside ; on plains and in bushy pastures, Sobato de Bumba, fl. Oct. 1855. No. **5275.**

20. **H. natalitius** Harv. in Harv. & Sond. Fl. Cap. ii. p. 587.

Golungo Alto.—A branched, very bright green herb, rough with rigid hairs shining like crystals ; petals sulphur-coloured, marked with dark-purple inside near the base ; in damp wooded stations, on the left bank of the river Quibôlo ; fl. and fr. April 1856. Nos. **4923, 5256.**

21. **H. pusillus** Thunb. Prodr. Fl. Cap. p. 118 (1794).

Huilla.—In stony sparingly grassy shrubby stations, near Lopollo ; fl. and fr. Nov. and Dec. 1859. No. **4930.**

22. **H. Welwitschii** Hiern, sp. n.

A small shrub, with a woody rootstock giving off numerous stems, 1 to 2 ft. high ; stems diffuse, ascending, terete, thickly beset with rough stellate tawny hairs, not prickly. Leaves oblong, rounded at both ends except a small apiculus at the apex, coriaceous, rigid, denticulate except towards the lower part, rough on both surfaces with close short stellate tawny hairs, 2 to 4 in. long, $\frac{1}{3}$ to 1 in. broad ; petiole $\frac{1}{4}$ to $\frac{3}{4}$ in. long, rough with short hairs ; stipules subulate, about $\frac{1}{8}$ in. long. Flowers in quasi-terminal leafy racemes ; pedicels ranging up to $\frac{5}{8}$ in. long, closely hairy, jointed about or below the middle. Epicalyx closely hairy, consisting of 5 or 6 linear-subulate segments, $\frac{1}{12}$ in. long, appressed to the calyx in flower, and about equalling its tube. Calyx hemispherical, $\frac{1}{4}$ in. long, rather deeply 5-cleft, tomentose ; lobes ovate, $\frac{1}{6}$ in. long. Corolla nearly $\frac{3}{4}$ in. long, of a brilliant vermilion colour, somewhat pilose outside. Style 5-lobed at the apex. Fruit not seen.

Pungo Andongo.—In wooded thickets, near Quitage ; fl. March 1857. A very beautiful plant. No. **4901.**

The affinity of this species appears to be with *H. æthiopicus* L.

23. **H. fugosioides** Hiern, sp. n.

A perennial herb, with a tuberous-fasciculate root, and elongate prostrate-ascending slender terete very tough and wiry hispid not prickly stems, from 2 ft. upwards, nearly simple or branched near the base. Leaves varying from roundly cordiform to lanceolate, mostly ovate, occasionally sub-trilobed, pointed or rounded at the apex, cordate or nearly truncate at the base, membranous, rather rigid, slightly rough with very short hairs, dull-green above, paler beneath, crenulate except towards the base, 1 to $2\frac{1}{4}$ in. long, $\frac{1}{2}$ to $1\frac{1}{2}$ in. broad; petiole $\frac{1}{8}$ to 1 in. long, hispid; stipules subulate, $\frac{1}{8}$ in. long, hispid. Peduncles axillary and solitary or gradually in terminal leafy racemes, ranging up to nearly 2 in. in length, clothed with very short hairs or nearly glabrate, jointed above the middle. Epicalyx hispid, consisting of 6 or 7 small subulate separate bracteoles, free from the calyx and much shorter than it. Calyx covered with very short hairs, deeply divided into 5 linear-lanceolate acute segments $\frac{1}{4}$ in. long. Petals glabrous, $\frac{3}{4}$ to 1 in. long, of a deep rose-colour. Fruit $\frac{1}{2}$ in. long, half-ellipsoidal; carpels 5, marked with reticular venation and very short hairs on the back, ciliate along the lines of dehiscence; seeds smooth to the touch, closely beset (as seen under a lens) with very small recurved prickles.

Pungo Andongo.—In rather moist sandy wooded thickets, near Pedras de Guinga; fl. and fr. Jan. 1857. No. **5237**.

This species belongs to the section Ketmia, and stands near to *H. articulatus* Hochst.

24. **H. huillensis** Hiern, sp. n.

An undershrub, $2\frac{1}{2}$ to 3 ft. high or more; branches virgate, tawny tomentose, not prickly, leafy, terete. Leaves ovate or the upper ones oblong, rather obtusely pointed at the apex, narrowed or obtuse at the base, rigidly membranous, rather softly tomentellous on both surfaces, somewhat tawny especially beneath, dentate except towards the base, occasionally a little 3-lobulate, $1\frac{1}{2}$ to 3 in. long, $\frac{3}{8}$ to 2 in. broad; petiole tomentose, ranging up to $\frac{3}{8}$ in. long, ascending; stipules filiform, $\frac{1}{8}$ in. long, hairy. Flowers arranged in quasi-terminal leafy racemose cymes. Epicalyx of about 5 small subulate separate bracteoles, about equalling the calyx-tube, hairy. Calyx hairy, rather deeply 5-cleft, $\frac{3}{8}$ in. long; lobes lanceolate, $\frac{1}{5}$ to $\frac{1}{4}$ in. long. Petals hairy outside, $\frac{3}{4}$ in. long, of a brilliant scarlet colour. Style-branches 5, slender. Fruit $\frac{1}{2}$ in. long, obtuse, exceeding the calyx; carpels 5, spread outside with short stiff up-curving hairs; seeds clothed with reddish long shaggy hairs about as long as the body of the seeds.

Huilla.—In the wooded thickets of the last peak of the Serra da Xella; abundant; fl. Oct. 1859. No. **4942**. Mumpulla, sparingly; fr. Oct. 1859. No. **4942***b*.

This species belongs to the section Bombycella.

25. **H. petræus** Hiern, sp. n.

Rootstock woody, with numerous ascending or erect terete wiry rather slender stellately hairy not prickly stems, 2 to 6 in. high,

of a pallid grey-green colour. Leaves oblong, mostly ascending, acute or pointed at the apex, more or less wedge-shaped or nearly rounded at the base, coriaceous or rigid, of a grey-green colour on both surfaces, rather paler beneath, with scattered stellate hairs above and minutely punctate beneath, with spreading pointed teeth on the margin except towards the base, $\frac{3}{4}$ to $2\frac{1}{2}$ in. long, $\frac{1}{6}$ to $\frac{1}{2}$ in. broad; petiole $\frac{1}{16}$ to $\frac{1}{2}$ in. long, stellate-hairy; stipules subulate, $\frac{1}{16}$ to $\frac{1}{8}$ in. long, hairy. Peduncles axillary, solitary, 1 to 2 in. long, scattered with stellate hairs, jointed at or rather above the middle. Epicalyx tawny-hairy, consisting of about 7 subulate separate bracteoles, about $\frac{1}{12}$ in. long, appressed to the calyx-tube or more or less spreading. Calyx deeply 5-lobed, tawny-hairy, $\frac{1}{4}$ to $\frac{3}{8}$ in. long; lobes lanceolate, acute. Petals scarlet, $\frac{1}{2}$ to $\frac{5}{8}$ in. long, somewhat pilose outside. Fruit depresso-globose, tawny tomentose outside, $\frac{3}{8}$ in. long; seeds covered with pale cottony hairs.

Huilla.—In dry thickets and rocky pastures clothed with short bushes; in very hard ground, near Lopollo; rather rare; fl. and fr. Nov. 1860. No. **4943.**

This species belongs to the section Bombycella, and is related to *H. pusillus* Thunb.

9. **CIENFUEGOSIA** Cav. Diss. ii. App. (1786), & iii. p. 174, t. 72, fig. 2 (1787). *Fugosia* Juss.; Benth. & Hook. f. Gen. Pl. i. p. 208.

1. **C. pentaphylla** K. Schumann in Engl. Bot. Jahrb. x. p. 46 (1889).

C. anomala Gürke in Engl. Bot. Jahrb. xix. Beiblatt, No. 48, p. 1 (1894). *Gossypium anomalum* Wawra & Peyr. Sert. Beng. p. 21 (1860); Masters in Oliv. Fl. Trop. Afr. i. p. 211. *G. microcarpum* Welw. ms. ex Gürke, *l.c.*

Loanda.—Rather rare in dry bushy places near Teba, very rarely near Penedo in company with *Abrus*; fl. and fr. April and May 1854; a slender shrub, 4 ft. high, petals of a pallid-sulphur colour, inside glossy-purple near the base, between Teba and Penedo; fl. and fr. end of March 1858. No. **5221.** Coll. Carp. 262.

Mossamedes and Bumbo.—A shrub, 1 to 4 ft. high, with numerous erect oblique stems, divaricately branched from the base; flowers yellow, fruit of the size of a large hazel-nut, not uncommon in gravelly thickets along the banks of the river Bero, fl. and fr. July 1859; a little slender tree, 6 to 8 ft. high, with a trunk 1 to $1\frac{1}{2}$ in. in diameter, flowers from whitish turning pale-red, petals marked inside near the base with a large red-purple spot, in the more elevated parts of Serra da Xella. No. **5220.** A much-branched shrub, 3 to 8 ft. high; flowers of a wine-red colour; capsules of the size of a large hazel-nut, 3-4-celled, 3-4-valved; seeds clothed with a dense and closely adhering cottony wool of a red-cinnamon colour; frequent from Quitibe and Pomangala up to Bumbo; at Quitibe June 1860. Coll. Carp. 30.

10. **GOSSYPIUM** L.; Benth. & Hook. f. Gen. Pl. i. 209.

1. **G. barbadense** L. Sp. Pl. p. 693 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 210.

Prince's Island.—Sept. 1853. Coll. Carp. 265.

St. Thomas' Island.—In the more elevated wooded parts of the island ; perhaps formerly introduced there ; cotton of a pale-cinnamon or dirty chestnut-yellow colour ; Dec. 1860. Coll. Carp. 264.

Welwitsch in *Apontamentos*, p. 558, states that three distinct kinds of cotton are cultivated in Angola with greater or less frequency. He calls them *G. vitifolium*, *G. barbadense*, and *G. herbaceum*, the two first being also met with wild in the neighbourhood of villages ; the last name, however, does not appear to apply to the species so called by Linnæus.

The specimens in the collection may be placed under the following four names, here used as sub-species :—

(1) *G. punctatum* Schum. in Beskr. Guin. Plant. p. 309 (1827) ; *G. barbadense* L., var. *hirsutum* Welw. Apontamentos, p. 590, n. 83.

Loanda.—A shrub, 4 to 6 ft. wide ; stem erect, with spreading elongated branches ; flowers at first sulphur-coloured, soon turning wine-reddish ; cultivated and half-wild as an escape from cultivation in rather moist sandy fields near Imbondeiro dos Lobos ; fl. March, fr. July 1858. Wild and cultivated, especially in the drier plains throughout Angola, mixed with other forms. The ordinary form becomes hairy when growing in rather dry fields after disused cultivation. Represa de Conceiçaõ, between Penedo and Forte de S. Pedro ; fl. and fr. end of July 1854. No. **5235.**

Golungo Alto.—A cultivated annual plant ; flowers from whitish to violet-purple ; seeds received from Louisiana under the name of "Buena Vista," and planted 12 Feb. 1856 ; first fl. end of March ; first ripe fr. middle of May 1856 ; capsules almost ripe at end of April 1856 ; Arimo de Mariano, Cacarambola ; cultivated in fields near Sange ; with a sample of the cotton grown from the Louisiana seeds. No. **5224.** Coll. Carp. 258, 259, 260. Cultivated and subspontaneous in thickets about Sange, quite certainly not indigenous ; with yellow fl. end of Feb. 1856 ; wild and in fr., Quibolo, August 1856. No. **5223.**

Mossamedes.—Cultivated in the fields of Purificaçao, near Cavalheiros, but in small quantity ; fl. and fr. 23 April 1859. No. **5225.** In gardens near the city of Mossamedes ; fr. July 1859. No. **5226.**

(2) *G. maritimum* Todaro, Relaz. Cult. Coton. p. 225, t. 7, & t. 11, fig. 27 (1878).

Mossamedes.—An ill-shaped shrub, 2 to 3 or occasionally 4 ft. high ; cotton of a pallid cinnamon colour ; cultivated in the fields of Purificaçao, near Cavalheiros ; fl. and fr. August 1859 ; called by the colonists "Algadão côr de Ganga." No. **5222.** Cotton of a yellowish (Nanking) colour ; Fazenda dos Cavalheiros. Coll. Carp. 263.

(3) *G. peruvianum* Cav. Diss. vi. p. 313, t. 168 (1788).

Golungo Alto.—A shrub, 4 to 7 ft. high ; flowers at first of a deep yellow colour, soon turning wine-reddish ; abundant and wild in depressions and on the drier slopes, and also cultivated about the native villages and their lower parts ; Sange ; fl. July 1855. No. **5230.**

Mossamedes.—Sea-island cotton, fl. and fr. No. **5229.** Seeds solitary, not imbricate-distichous, with white cotton ; cultivated in the fields of Purificaçao, near Cavalheiros, fl. and fr. 23 August 1859, where it is called "Algodaõ de Panacho." No. **5232.**

(4) *G. acuminatum* Roxb. Hort. Beng. p. 51 (1814); *G. vitifolium* Welw. Apontamentos, p. 590, n. 94.

Loanda.—A shrub, 5 to 8 ft. high, branched from the base; branches and branchlets green, not purple; leaves and branchlets glabrous, very closely black-punctate; leaves 1-glandular beneath, with acuminate lobes; flowers very large, of a deep sulphur colour; capsules very large, 3-valved; cultivated rather sandy moist fields, near Quicuxe, Museque de Sr. Ricardo Silva Rejo, fl. and fr. beginning of March 1858; sent by Sr. Ricardo. No. **5227**. Coll. Carp. 261. A shrub, 6 ft. high, branched from the base; branches spreading-ascending; leaves almost always 3-cleft, 1-glandular, one leaflet of the outer calyx glandular; cultivated, Represa de Imbondeiro dos Lobos, fl. and young fr. end of July 1858; frequently cultivated in most of the districts of Angola, and almost everywhere wild at the back of dwellings, but nowhere indigenous. Native name "Muxinha." No. **5228**. A shrub, 8 ft. high, among plants of *Euphorbia Tirucalli* L., near Bemposta, fl. end of July 1858. No. **5234**.

Cazengo.—Flowers large, yellow; cotton but little adhering to the seeds; cultivated from seeds formerly introduced from Pernambuco; here and there subspontaneous, but only sporadic; in thickets by dwellings, near Cabonde Cacula; fl. Jan. No. **5233**.

Mossamedes.—Garden of Senhor Bernardo de Figuerendo, August 1859, fl. and fr., grown from seeds sent from Pernambuco, and called by the colonists "Algodaõ de pinha." No. **5231**.

11. **ADANSONIA** B. Juss. ex L.; Benth. & Hook. f. Gen. Pl. i. p. 209.

1. **A. digitata** B. Juss. ex L. Sp. Pl. p. 1190 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 212.

Loanda.—In Boa Vista (*Loranthus Mechowii* parasitic on it), fl. April 1854. No. **5418**. Alto das Cruzes, fl. Jan. 1859. No. **5418***b*. A little tree, 4 ft. high, road near Samba grande; foliage without fl. or fr. Nov. 1858. No. **5417**. The latest foliage on the large trees at Samba grande 30 July 1854. No. **5419**; fl. Feb. 1854. No. **5419***b*. Seeds August 1854. Coll. Carp. 107. Imbondeiro dos Lobos, fr. August 1858; fr. 2 ft. by $5\frac{1}{2}$ in. by $4\frac{1}{2}$ in. Coll. Carp. 269.

Golungo Alto.—Branch with foliage only. No. **5420**. String locally manufactured from the inner bark in 1856. Coll. Carp. 270.

Pungo Andongo.—Near the stronghold of Pungo Andongo, at Calundo, fl. beginning of Feb. 1857, sparingly; from Pungo Andongo towards the east this tree is rather rarely met with, and near Candumba up to Condo very rarely, in consequence of the elevation of this tract of country. Nos. **5415**, **5416**.

Bumbo.—In the drier wooded places near Bumbo, rather rare; more abundant in the rocky parts of the middle of Serra da Xella, at a place called Chaõ da Xella; altogether absent from the district of Huilla. (Ticket without specimen.) No. **4995**.

The name "Imbondeiro," by which Portuguese colonists in Angola call the *Adansonia*, is derived from the name "N-Bondo," which the natives give to this enormous tree; it is common in nearly all the littoral and hilly regions of Angola. The natives prepare the inner bark for the manufacture of string. After having made sufficient incisions across the piece intended for preparation, they strip the bark from the stem in sheets of 3 to 5 ft. in length by 2 or 3 ft. in breadth; this process is easily performed by reason of its spongy softness. After

a brief maceration, they expose the sheets to the sun for heating, and also submit them to beating, until the different parts of the fibrous layers separate. A clean inner bark then presents itself, which, when manufactured into sacking, serves for the package of coal, fruits, roots, cotton, etc.; or is unravelled and employed in the manufacture of various articles for domestic use, such as string, nets, wallets, etc. All the cotton which is sent from the interior of the province to the market at Loanda, and thence directly exported to the extent of many hundreds of stones (arrobas) weight, is there carried in bags made of the inner bark of *Imbondeiro*; and also the greater part of the gum copal and of Orchella-weed is conveyed in wrappers of the same material. Moreover, under suitable treatment, it would perhaps serve for the manufacture of coarse paper and of other similar goods. (See Welwitsch, Synopse, pp. 40, 41.)

The natives call the fruit of *Adansonia digitata* "Mûcua." This tree is considered with just reason the most characteristic plant of tropical Africa; it grows in nearly every part of the province of Angola, with the exception, however, of the highland region; it disappears altogether at an elevation of 4000 ft. above sea-level. The fruit furnishes, in the pulp which contains the seeds, a substance very advantageous for the preparation of lemonade, with an agreeable taste and with a particularly refreshing effect in the case of various febrile affections. The negroes make use of these Mûcuas for smoking their Riamba (*Cannabis*), and also for vessels of water and of other liquids (see Welwitsch, *l.c.*, p. 47). To enumerate the multifarious applications which the natives make of the various parts of this tree in their domestic economy would be to compose a long chapter of African ethnography. (See Welwitsch, Apontamentos, p. 598, under n. 136.)

During the Ambriz war many thousands of boxes of this material were manufactured within a few days in Sange in Golungo Alto for the conveyance of provisions to the seat of war.

12. **BOMBAX** L.; Benth. & Hook. f. Gen. Pl. i. p. 210.

1. **B. buonopozensis** P. Beauv. Fl. D'Owar. ii. t. 83, fig. 1 (1807), p. 42 (*Buonapozense*); Masters in Oliv. Fl. Trop. Afr. i. p. 213.

Golungo Alto.—An immense tree, 100 ft. high and more, leafless at the time of flowering, prickly when young after the manner of "Mafumeira" (*Ceiba Casearia*); trunk 4 to 10 ft. in diam.; flowers tulip-shaped, rose-scarlet, very handsome; (petals 2½ in. long); in the primitive forests of Capopa, not uncommon; fl. in Jan., Feb. and June 1855, and Jan. 1856; fr. Oct. 1856; in leaf in March and in August 1856, when an enormous tree of it was cut down to obtain specimens of the leaves; called by the colonists "Mafumeira incarnada." No. **5412**. Foliage and bark with prickles gathered at Capopa, Sept. 1855. No. **5413**. A young little tree of the gigantic tree "Mafuma" (with scarlet, tulip-shaped flowers), Capopa, Nov. 1855. No. **5414**. Coll. Carp. 271, 272.

13. **CEIBA** Plum. f. (1703); Adans. Fam. Pl. ii. p. 399 (1763).

Eriodendron DC.; Benth. & Hook. f. Gen. Pl. i. p. 210.

1. **C. Casearia** Medic. Malv. Fam. p. 16 (1787).

Eriodendron anfractuosum DC. Prodr. i. p. 479 (1824); Masters in Oliv. Fl. Trop. Afr. i. p. 214.

Ambriz.—On the Quizembo river, near the little bank; foliage without fl. or fr. Nov. No. **5406**.

Icolo e Bengo.—Foto, on the Dande; fl. Sept. No. **5404**. St. Antonio; fr. Dec. No. **5405**. Abundant at the banks of the river Bengo; one side of the tree had leafy branches without flowers, and the other had flowering branches without leaves, Sept. 1854. No. **5407**. An eminently handsome tree, 80 to 100 ft. and more; the trunk is not unfrequently excavated by the natives for boats, as are the gigantic trunks of *Adansonia*, which it rivals; abundant in the wooded parts near the river Bengo, fl. with or without leaves, middle of Sept. 1857; called by the natives "Mufuma." No. **5408**.

Golungo Alto.—In the forest, near Mussengue; capsule pentagonal-conical, 4 in. long, 5-valved; valves free from the pentagonal axis: June 1856. No. **5409**. Eastern Queta, fl. Dec. 1855. No. **5410**. Coll. Carp. 273.

St. Thomas' Island.—"Ocá"; end of Dec. 1860,; fl. and fr. No. **5411**.

Dishes or small bowls are made from the wood of "Mufumeira," and the natives in Angola usually make use of them at their meals. The Mufumeiras (the Portuguese name for Mufuma, by which the native tribes call this tree) are, with the exception of *Adansonia*, the most gigantic and bulky of the Bombax group in Tropical Africa; they grow by preference along rivers and streams, remarkably adorning the country of Portuguese Africa with their majestic crowns. Not only these small bowls, but also much larger ones for baths, washing-tubs, etc., and nearly all the canoes are made from the trunks, which not uncommonly attain 120 ft. in height and 8 to 12 ft. in diam. at the lower part of the trunk. The wool in which the seeds are enveloped is known under the name of "Suma-uma"; but not being of much durability and of very little elasticity, it is not of much use. (See Welwitsch, Synopse, p. 21, and Apontamentos, p. 559.)

XXIV. STERCULIACEÆ.

This Order contains trees of the finest habit belonging to the giants of the vegetable kingdom, and also some of the most useful trees of the tropical zone. The great promptness with which many of these trees strike root, from branches stuck in the ground in the rainy season, considerably facilitates the formation of fences and the planting of roads and squares with trees, especially in the hilly and upland districts; stakes of 3 to 5 in. in diam., so planted, become established in a few months, and within a year form tolerably bushy little trees. Some species of *Sterculia* furnish gum tragacanth of excellent quality; a species of *Edwardia* has edible fruit; and several plants of the Order afford textile material for the manufacture of ropes, provision-bags, and other such domestic articles. (See Welwitsch, Apont. p. 558.)

1. **STERCULIA** L.; Benth & Hook. f. Gen. Pl. i. p. 217.

1. **S. pubescens** G. Don ex Loudon, Hort. Brit. p. 392 (May 1830); G. Don, Gen. Syst. i. p. 515 (1831).

S. Tragacantha Lindl. Bot. Reg. t. 1353 (Sept. 1830); Masters in Oliv. Fl. Trop. Afr. i. p. 216; Brown in Pl. Jav. Rar. p. 233.

Golungo Alto.—A lofty tree, 100 to 120 ft. high, remarkable for a very strictly erect trunk; not uncommon in forests whether dense or sparse, often in company with *Elaeis guineensis*; (fruit carpels 1½ in.

to 2½ in. long) ; near Canguerasange, etc. ; fl. Oct. 1854, fr. August. No. **4685**. A young tree, 20 ft. high, with a broad crown ; flowers of a cinnamon-reddish colour ; in less dense forests, throughout the district ; at Sange, fl. April 1856. No. **4689**. By the river Delamboa, fl. August 1856 ; native name "Quibondo." No. **4690**.

Pungo Andongo.—A tree, 20 ft. high, probably a young one ; in the wooded parts of Barranco da Pedra Songue within the citadel ; with foliage but without flowers, Feb. 1857. No. **4688**.

The two following numbers show leaves less pubescent beneath, but are without either flowers or fruits ; they may, however, belong here :—

Golungo Alto.—From the Government House courtyard in Sange, said by Welwitsch to be the species from which he collected the flowers in the last quarter of 1854 on the Delamboa ; Sept. 10th, 1856 ; native name "Quibondo ca menha." No. **4686**. In hedge at Sange, May 1856. No. **4684**.

The following probably belongs to this species :—

Golungo Alto.—A lofty tree ; fibre excellent for various purposes ; the natives call the tree "Quibondo," and the fruit "Mūcŏlŏcôcŏ" ; Sange 1855 (seeds albuminous, ½ to ⅔ in. long ; fruit 2 in. long). Coll. Carp. 276.

The following three numbers of the herbarium (and the two of the carpological collection) perhaps belong to the same species ; but their leaves differ by being glabrous or nearly so :—

Golungo Alto.—A tree, 30 to 60 ft. high, with a quite straight trunk, unbranched below and forming above a more or less depressed ovoid crown ; in forests by the river Luinho, but always in drier spots than "Quibondo ca menha" ; in flower at Sange at the beginning of July 1856 ; native name "Quibondo ià Molemba." No. **4681**. Frequent as saplings in the Alameda at Sange, and in company with the "Quibondo ca menha," in the Government courtyard ; leaves much larger (attaining more than a foot long by 7 inches broad) nearly glabrous and more deeply cordate at the base than in that tree ; in fruit with ripe seeds, near the wall of the courtyard, Sept. 10th, 1856 ; the capsules of this species or variety are when young of a peach-red colour, and when old of a rusty brownish-grey. No. **4682**. At the great cataract of the river Cuango, near Sange ; leaves of the young "Bondo-ià-Molemba" ; August 1855. No. **4683**. Coll. Carp. 279. Ripe seeds very bitter, of a cinnamon-red colour ; native name "N-Bondo ià Molemba" ; March 1856. Coll. Carp. 278.

An imperfect specimen, No. **4687**, bearing an oval leaf 10½ in. long by 6 in. broad, besides the petiole of 3¼ in. long, glabrous except the middle and lateral veins beneath and petiole, from Monte Caffe in the Island of St. Thomas, Dec. 1890, may be mentioned here, but it appears to belong to a different species ; it is there called "Nespera." The timber of this tree is said to be good, strong and durable, and to be the same as that known in Prince's Island as "popó." See Ficalho, Pl. Ut. p. 106 (1884).

2. **S. tomentosa** Guill. & Perr. Fl. Senegamb. Tent. p. 81, t. 16 (1831) ; Masters, *l.c.*, p. 217 ; non Thunb.

Loanda.—Museque Schut ; fl. Dec. 1857 ; native name "Chixe" ; (carpels 3 in. long, hispid-tomentose outside, pilose with stellate hairs inside ; leaves ranging up to 5 in. in length). No. **4691**. A tree,

trunk already branched a little above the base; branches as well as the trunk of a leaden-grey colour; flowers red-greenish; on the island Cazanga, fl. March 1858; native name "Chixe." From the same tree Welwitsch had gathered a great quantity of gum tragacanth. No. **4692.** Island of Loanda; 1858; native name "Muchiche"; carpels 2 to 2¼ in. long, tawny-tomentose and scattered with rigid hairs outside; seeds ellipsoidal, ½ in. long by ⅓ in. thick. Coll. Carp. 275, 280.

Gum tragacanth or "Alquitiri" is obtained in abundance from the thick trunk of this tree, which is very abundant in dry situations throughout the coast region from Ambriz to the mouth of the river Cuanza. The natives call the tree "Chixe," and the gum "Ici ià Chixe," but they do not make any use of it except for food in time of great famine. It appears identical in quality with the gum Alquitiri of the East, and can be collected in known places in great quantity. (See Welwitsch, Synopse, p. 36.)

Golungo Alto and Zenza do Golungo.—Leaves fallen from a tree then entirely leafless, but evidently belonging to it; between Calolo and Montes de Mongollo; a common tree, with bark of a grey-green almost leaden colour, Sept. 1857. A very lofty tree in the forests near Muria, and in hilly situations near Calumguembo a tree of 15 to 25 ft., always with a bark of a leaden colour; Sept. 1857. Coll. Carp. 277.

3. **S. cinerea** A. Rich. Tent. Fl. Abyss. i. p. 74, t. 16 (1847); Masters, *l.c.*, p. 218.

Cazengo.—A moderate-sized tree, 25 to 30 ft. high; trunk 1½ to 2 ft. in diameter at the base, exuding a gummy resin, clothed as well as the patently divaricate branches with a whitish bark (like that in *Betula alba*); flowers from yellow turning reddish; capsules of a pleasant ruddy colour (seeds albuminous); in shallow depressions on plains between Muxaula and Cacula; fl. and fr. June 1855. No. **4694.**

The specimens differ from the type by the lower surface of the leaves being clothed with a short pale-tawny tomentum, but not ashy-tomentose. The male flowers have their anthers crowded in a head, not disposed in a single row. This form helps to break down the distinction between *S. tomentosa* G. & P. and *S. cinerea* A. Rich.

4. **S. ambacensis** Welw. ms. in Herb.

A moderate-sized tree 15 to 30 ft. high, with the habit nearly of *Monodora Myristica*; trunk about a foot in diameter near the base; crown handsomely widened out, with spreading branches. Leaves obovate, rounded or nearly so at the apex, more or less narrowed to a wedge-shaped obtuse or rounded base, glabrous (or with scattered minute stellate hairs beneath, especially when young), glaucous especially above, firmly but rather thinly coriaceous, 5 to 9 in. long, 2¼ to 5¼ in. wide, 1-nerved at the base (or 3 to 5-nerved near the base); petiole ¾ to 2 in. long, glabrate, of an ashy-purple colour; stipules deciduous. Flowers not seen. Follicles nearly 3 in. long, 1⅓ in. wide, of a yellowish-cinnamon colour, outside very thinly tomentose and frequently beset with little gummy drops; seeds 5 to 7 in each follicle, oblong-cylindrical. ⅝ in. long, very copious, albuminous. Fruit and seeds like those of "Quibondo."

Ambaca.—Rather rare on rather moist wooded slopes, at an elevation of about 3200 ft. above sea-level, near a place called Puricacarambola, in nearly ripe fr. middle of Oct. 1856. No. **4695**. Coll. Carp. 274, 946.

2. **OCTOLOBUS** Welw. ex Benth. & Hook. f. Gen. Pl. i. p. 982 (1867); Welw. in Trans. Linn. Soc. Lond. xxvii. p. 17 (1869).

1. **O. spectabilis** Welw. in Trans. Linn. Soc., *l.c.*, p. 18, t. 6.

Pungo Andongo.—A tree, 15 to 25 ft. high, patently branched, with a lax crown; sporadic, in the mountainous rocky woods of the fortress of Pungo Andongo, at a place called Barranco da Pedra Songue; fl. Jan., fr. April 1857. No. **1202**. Coll. Carp. 281.

3. **EDWARDIA** Rafinesque, Specchio delle Scienze, tom. 2 (No. xi.), p. 158 (1 Nov. 1814). *Cola* H. Schott & Endl.; Benth. & Hook. f. Gen. Pl. i. p. 218.

1. **E. lurida** Rafinesque, *l.c.*

Cola acuminata Brown in Pl. Jav. Rar. p. 237 (1844); Masters in Oliv. Fl. Trop. Afr. i. p. 220. *Lunanea Bichy* DC. Prodr. ii. p. 92 (1825).

Golungo Alto.—In the forests of Cabanga Cacabango; fl. Jan. 1855. No. **4669**. At Bango Aquitamba, flower-bud Dec. 1854. No. **4670**. A copiously leafy tree, 25 to 60 ft. high and more, affording friendly hospitality to mosses, lichens, orchids and *Rhipsalis Cassytha* Gaertn.; seeds eaten by the negroes; in the dense forests of Sobato de Quilembo-Quiacatubia; fr. from Nov. to Jan., fl. and young fr. Feb. 1855. No. **4671**. At Quilombo, fl. July 1856. No. **4672**. A little tree, 8 ft. high; at Capopa, not in fl. Dec. 1855. No. **4673**. Nuts of Cola. Coll. Carp. 282.

Island of St. Thomas.—In flower-bud Dec. 1860; called "Cola." No. **4677**.

Sierra Leone.—Fl. Sept. 1853; perhaps var. β. (*Sterculia macrocarpa* G. Don Gen. Syst. i. p. 515, 1831). No. **4676**.

The next two Nos. differ by their more oblong leaves rounded at the base, and may belong to a different species:—

Golungo Alto.—Capopa, Aug. 1856; branch with foliage. No. **4674**. A shrub or little tree, 10 to 12 ft. high; branches rather erect; branchlets green; habit of *Laurus* or of *Mangifera*; leaves coriaceous, evergreen, with the petiole much swollen at the base of the blade and twice jointed—namely, there and at its insertion; about the spring at Capopa in Sobato de Bumba; not yet seen in flower, July 1855. No. **4675**.

According to a note amongst Welwitsch's mss. the expanded flowers of this tree possess a vinous-aromatic odour, which, however, after complete fecundation, becomes fetid and almost excremental. The plant is both indigenous and cultivated in the mountainous districts, and affords a lucrative article of export to Brazil.

2. **E. caricæfolia** O. Kuntze, Rev. Gen. i. p. 79 (1891).

Cola Afzelii Masters, *l.c.*, p. 223.

Golungo Alto.—A slender little tree, with branches forming a leafy crown, never seen by Welwitsch in flower; leaves like in habit those of some Euphorbiaceæ. At the skirts of primitive forests, near Sange, Dec. 1855. No. **4680**. Apparently belonging to this species, although the leaf differs from those of Brown's types by the absence of ferruginous spreading hairs on the principal nerves near the base

and on the upper part of the petiole. The description given by Masters of his *Cola Afzelii* states that the flowers are arranged in short terminal clusters, whereas Brown's diagnosis gives the flowers as cauline.

3. **E. heterophylla** O. Kuntze, Rev. Gen. i. p. 79 (1891).

Cola heterophylla H. Schott & Endl., Meletemata Bot. p. 33 (1832); Masters, *l.c.*, p. 223.

Golungo Alto and Cazengo.—A tree, 20 to 30 ft. high or more when growing in primitive forests, or about villages usually a shrub of 12 to 15 ft., evergreen, with coriaceous leaves very variable in form. Flowers dicœcious, honey scented ; calyx whether of the male or female plant cyathiform or urceolate-campanulate, cleft one-third way down in 4 or 5, usually 4, ovate-triangular lobes, at first erect, after fecundation reflected at the apex ; staminal tube short, a little constricted in the middle, with yellow densely heaped-together anthers. In the female flower the staminal tube is very shortly concrete with the carpophore ; anthers large, whitish, empty, surrounding like a girdle the base of the densely pilose germen. Germen spherical, beset all over with rigid ashy very dense hairs ; style very short, crowned with 5 or occasionally 6 scarlet capituliform stigmas, which spread radiately and are in some cases quite connate, and in others more loosely so. Fruit brilliantly velvety-scarlet ; follicles 5 (1 to 6), sessile, spreading in a stellate manner, more or less boat-shaped, filled with an orange-coloured agreeable acidulous pulp which encloses a few seeds. Abundant in tall thickets and moist forests ; fl. Dec. and July, fr. in May 1854, 1855. Native name "Mabuinguiri." No. **4678**. A small tree of 15 to 25 ft., with erect branches, leafy at the apex ; flowers tetramerous ; fruit orange-scarlet, edible, as large as a peach ; sporadic in the more elevated forests of Sovado de Quilombo and Bango ; female fl. end of Feb. and ripe fr. in March. No. **4679**. Coll. Carp. 283.

See Welwitsch, Apontamentos, p. 559.

4. **ASSONIA** Cav. Diss. ii. App. (1786) and iii. p. 120, t. 42 (1787).

Dombeya Cav. (1786), Benth. & Hook. f. Gen. Pl. i. p. 221, non L'Herit. (1784).

1. **A. reticulata** O. Kuntze, Rev. Gen. i. p. 76 (1891).

Dombeya reticulata Masters in Oliv. Fl. Trop. Afr. i. p. 228.

Pungo Andongo.—Fl. Nos. **4732**, **4733**. In No. **4732** the inflorescence much resembles in form that of *D. reticulata* Masters, but the peduncles had not yet become glabrous, and the cordiform-ovate leaves are not attached to the following branch. No. **4733** is represented by fragments of a leaf and inflorescence, but they may, perhaps, belong to this species. In each No. the style is trifid.

2. **A. huillensis** Hiern, sp. n.

A little bushy tree, with dark-ashy glabrate branches, and somewhat velvety branchlets more or less clothed with pale-tawny stellate-hairy tomentum. Leaves ovate or cordiform, obtuse or subacute at the apex, cordate at the base, not distinctly lobed, irregularly dentate, thickly coriaceous, rather rugose and rough with stellate hairs above, more closely covered with stellate pale-tawny hairs beneath, 5-7-nerved at the base, rather strongly reticulate, 2 to 6 in. long by $1\frac{3}{4}$ to $4\frac{3}{4}$ in. wide; petiole velvety, $\frac{1}{2}$ to $1\frac{1}{4}$ in. long ; stipules lanceolate-linear, acute, $\frac{1}{4}$ in. long, deciduous. Inflorescence pilose with very pale-tawny branched

hairs, axillary in the axils of the upper leaves or lateral on the young shoots before the appearance of the leaves, repeatedly forked, many-flowered, sometimes with a single flower in a fork, 1½ to 2 in. long; pedicels ranging up to ½ in. long, mostly short; bracteoles small, deciduous. Flowers white, nearly ½ in. long; calyx-segments lanceolate, stellate-hairy outside, glabrous inside, nearly ¼ in. long; petals broad, white; stamens united only near the base, fertile ones 15?; styles divided into 3 branches nearly from the base; ovary hairy.

Huilla.—At the skirts of forests, in the road leading towards Quipungo; in flower without leaves in May 1860, in leaf at the end of May 1860. No. **4726**. Very abundant in the drier forests, everywhere around Lopollo, with white flowers and with foliage at the end of May 1860. No. **4727**. In the rocky wooded parts of Morro de Lopollo; a little low tree, in leaf without flowers, March 1860. No. **4728**.

This species differs from *Xeropetalum multiflorum* Endl. by the pilose and more crowded inflorescence with broader petals; the leaves also are much larger, but the increased size is perhaps explained by their being fully developed in our specimens, but young in those seen by Endlicher.

3. **A. cuanzensis** Hiern.

Dombeya (*Xeropetalum*) *cuanzensis* Welw. ex Ficalho, Pl. Ut. p. 109 (1884).

A small tree, 15 to 20 ft. high or occasionally more; trunk, ½ to 1 ft. in diameter near the base; bark deeply rimose, very rough; branches patently divaricate, tortuous; branches leafy, especially towards the apex. Leaves sub-orbicular or cordiform, often slightly 3-lobed near the apex, rounded or obtuse at the apex, more or less deeply cordate at the base, irregularly dentate or sometimes sinuous-lobulate, firmly coriaceous, stellate-hairy especially beneath, becoming harsh above, about 9-nerved at the base, 4 to 8 in. long by 4 to 6½ in. wide, crowded at the extremities of the branchlets; petiole more or less tomentose with pallid shaggy and stellate hairs, 1 to 5 in. long; stipules ovate, hairy outside, ⅓ to ½ in. long, deciduous. Inflorescence shaggy-tomentose with pale hairs, much branched, corymbosely cymose, sub-terminal near the tips of the branchlets, 4 to 6 in. in diameter, many-flowered; peduncle 2 to 4 in. long; pedicels ranging up to ½ in. long; bracteoles very narrow, deciduous, hairy. Flowers hermaphrodite, often more or less drooping, ½ to ⅔ in. long; calyx shaggy outside, glabrous inside, ¼ in. long, deeply and unequally cleft, lobes lanceolate or ovate, valvate; calycine bracts narrow, deciduous; corolla, ½ to 1 in. in diameter, glabrous, brightly white, petals 5, unequal-sided, broadly obovate, sinistrorsely contorted in æstivation; stamens 20, united only near the base, 15 fertile and 5 sterile, the latter the longer, 3 fertile ones alternating with 1 sterile, anthers introrse; style 3-4-cleft not more than half-way down, lobes stigmatose on the inner side.

Pungo Andongo.—Very abundant in open woods along the banks of the river Cuanza, from Sansamanda as far as Condo; in fl. and leaf 1 May 1857. Native name "Mututu" or "Catutu." No. **4735**. Calunda, Jan. 1857; leafy shoots, apparently belonging here. No. **4736**.

4. **A. Burgessiæ** O. Kuntze Rev. Gen. i. p. 76 (1891); *Dombeya Burgessiæ* Gerr. ex Harv. in Harv. & Sond. Fl. Cap. ii. p. 590 (1862); Masters, *l.c.*, p. 228; var. **crenulata**.

D. Burgessiæ var. *crenulata* Szyszlowicz in Rozpr. Spraw. Pos. Wydz. mat.-przyr. xvii. p. 137 (Cracow, 1888).

Huilla.—A bush or tree, 10 to 25 ft. high, with erect-patent branches leafy at the extremities; in the more elevated forests of Serra da Xella and near Mumpulla, June 1860. (Umbel about 15-flowered.) No. **4731.**

5. **A. Mastersii** O. Kuntze, Rev. Gen. i. p. 76 (1891).

D. Mastersii Hook. f. in Bot. Mag. t. 5639 (1867); Masters, *l.c.*, p. 228.

Ambaca.—A bush, 12 to 15 ft. high; branches long, lax, leafy at the apex; flowers white, June (8), 1857; behind the stream where Welwitsch collected seeds, Oct. 1856. No. **4737.** Cultivated in Lisbon from seeds collected in the district of Ambaca in 1856; a leafy shoot, without flowers. No. **4738.** Sporadic by rivulets in thickets between the river Lucala and Zamba; fr. Oct. 1856. No. **4739.** Ripe fruit with seeds. Coll. Carp. 285.

6. **A. sparmannioides** Hiern, sp. n.

A shrub of 5 to 10 ft. in height, with the habit of a *Sparmannia*, or perhaps a tree, with lax rather erect glabrescent fuscous branches; branchlets subterete, scattered with long hairs branched at the base. Leaves long-stalked, di-poly-morphous, mostly with 3 not deep lobes, middle lobe usually deltoid acute, larger than the lateral lobes, irregularly crenate-dentate, cordiform towards the base, submembranous (when recently developed), thinly scattered with appressed not stelliform hairs on both surfaces, 3 to 6 in. long by $2\frac{1}{2}$ to 6 in. wide; petiole $1\frac{1}{2}$ to 5 in. long, hirsute with spreading hairs; stipules narrow, hairy, deciduous. Inflorescence umbelliform, about 3 in. in diam., hirsute in the upper axils, about 15-flowered; peduncle $1\frac{1}{4}$ to $1\frac{3}{4}$ in. long; pedicels about $\frac{3}{4}$ in. long, clothed with long spreading hairs; flowers about $\frac{1}{2}$ to $\frac{5}{8}$ in. long, 1 to $1\frac{1}{4}$ in. in diam., of a whitish-rose-colour; bracts lanceolate, hairy, deciduous; calyx $\frac{1}{2}$ in. long, hairy outside, glabrous inside, lobes lanceolate, $\frac{3}{8}$ in. long, at length reflexed, persistent; petals broadly obovate, scarious, persistent, white except the rose-coloured inside of the base, turning brown after flowering; stamens 15 to 20, of which 5 are sterile longer and ligulate, united at the base into a shallow rose-coloured cup; style firm, red, divided at the apex into 5 stigmas reflected in a circinate manner; ovary 5-celled, densely clothed with whitish hirsute hairs, cells few-ovuled.

Golungo Alto.—Sporadic on the bushy slopes of Cacarambolo; fl. end of July 1855, with recently developed foliage in Jan. 1856, and in flower-bud in June 1856. No. **4734.** In fruit, perhaps not quite ripe. Coll. Carp. 284.

Nearly related to *A. Schimperiana*, but without the patch of rufous hairs which is found at the junction of the blade of the leaf with the petiole in the case of the latter, and the staminal tube is shorter.

7. **A. Schimperiana** O. Kuntze, Rev. Gen. i. p. 76 (1891).
Dombeya Schimperiana A. Rich. Tent. Fl. Abyss. i. p. 78, t. 19 (1847); Masters, *l.c.*, p. 229.

Var. (?) **lobulata.**
Leaves shortly 3-5-lobed, 8 to 10 in. long by 7 to 9 in. wide, more or less stellate-hairy on both sides, petiole $5\frac{1}{2}$ to $7\frac{1}{2}$ in. long, stipules not persistent.

Bumbo.—A tree; in the primitive forests of Serra da Xella, fl. June 1860. No. **4729.**
Huilla.—Between the top of Serra da Xella and Mumpulla, fr. Oct. 1859. No. **4730.**

5. **MELHANIA** Forsk.; Benth. & Hook. f. Gen. Pl. i. p. 222.

1. **M. ferruginea** A. Rich. Tent. Fl. Abyss. i. p. 76; Masters in Oliv. Fl. Trop. Afr. i. p. 231.

Huilla.—A little shrub, 2 ft. high, very sparingly branched, with yellow flowers; peduncles never seen by Welwitsch bearing only one flower; rare, in shrubby places along the stream of Monino; fl. April 1860. No. **4741.**

2. **M. Forbesii** Planchon ex Masters, *l.c.*, p. 231.

Loanda.—In some cases a shrub of 3 ft. in height, and in other cases almost an herbaceous plant of as many inches; uncommon, in bushy stations about the swamps of Quicuxe; fl. and fr. beginning of May 1854. No. **4743.** Coll. Carp. 288. A little shrub, 1 to 2 ft. high, sparingly branched, or sometimes an herbaceous annual already flowering and fruiting; petals of a sulphur-yellow colour, soon turning almost saffron-yellow; in hilly shortly-bushy stations about swamps and marshes; very rare and only found near Quicuxe; fl. and fr. end of April 1858. No. **4742.** Fl. and fr. July 1860. Coll. Carp. 286.

3. **M. incana** Heyne ex Wallich List, n. 1200 (1828); var. **albiflora.**
A little low shrub branched from the base; branches ascending; flowers white, rather large for the genus. (Root 8 in. long; branch 6 in. long, nearly simple.)

Mossamedes.—In sandy stations near the river Bero, very scarce; fl. and fr. end of July 1859. No. **4740.** The species, of which Welwitsch's No. is considered to be a variety, scarcely differs from *M. abyssinica* A. Rich.

6. **HERMANNIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 223.

1. **H. tigrensis** Hochst. in Herb. Schimp. Abyss. sect. ii. n. 812; A. Rich. Tent. Fl. Abyss. i. p. 74. tab. 17 (*tigreensis*) (1847); Masters in Oliv. Fl. Trop. Afr. i. p. 233.

Ambaca.—A tender villous annual herb, nearly 2 ft. high; petiole bistipulate; in flooded stations about to become dry, on the left bank of the river Caringa, sparingly; fl. and fr. June 1855. No. **4699.**
Golungo Alto.—A little annual herb, prostrate or ascending, rather pilose, much branched divaricately; leaves serrate-dentate, with 2 stipules; flowers of a paler or deeper yellowish colour; in rather moist sandy stations, and also in drier places, between Trombeta

and Cambondo, and in sparingly grassy spots near Luinha, not uncommon ; fl. and fr. June 1855. No. **4700**.

Pungo Andongo.—An erect annual herb, a foot high, branched from the base ; in rather moist wooded meadows, between Pedras de Guinga and Candumba ; in leaf and not yet in flower March 1857. No. **4701**. An annual much-branched diffuse herb, with small yellow flowers and the habit almost of an *Evolvulus* ; in the bushy sparingly grassy parts of Calundo in the fortress of Pungo Andongo, abundant ; fl. and fr. May 1857. No. **4702**. At the sandy skirts of forests between Condo and Quisonde ; fl. and fr. March 1857. No. **4703**.

Huilla.—Catumba ; fl. and fr. 4 April 1860. No. **4705**.

2. **H. viscosa** Hiern, sp. n.

A rigid glandular-viscid intricately branched or distorted low undershrub ; stems 1 to 2 ft. long, ascending, glabrate and dark-ashy below, hairy and glandular-viscid above. Leaves oval or oval-oblong, more or less rounded at both ends, serrate-dentate except near the 3-nerved base, stellate-hairy and often glandular-viscid on both surfaces, $\frac{1}{3}$ to $1\frac{1}{4}$ in. long by $\frac{1}{6}$ to $\frac{5}{8}$ in. wide ; petiole $\frac{1}{5}$ to $\frac{1}{2}$ in. long, glandular-viscid ; lanceolate-linear, $\frac{1}{8}$ in. long. Flowers mostly in the axil of the upper leaves, arranged in terminal leafy racemes, of a violet-rose colour, turning almost purple, $\frac{1}{4}$ in. long ; peduncles or pedicels $\frac{1}{8}$ to $\frac{1}{2}$ in., more or less glandular-viscid, often bracteolate and bent at the joint. Calyx $\frac{1}{4}$ in. long, deeply 5-lobed, hairy and glandular-viscid outside, glabrous inside ; lobes linear-lanceolate, acute. Petals obovate, obtuse, glabrous, shorter than the calyx, dextrorsely contorted in æstivation as regarded from within. Stamens about as long as the calyx ; anthers somewhat hairy, longer than the filaments which are dilated above. Style glabrous above, hairy in the lower part, rather exceeding the anthers ; ovary glabrous below, hairy towards the apex. Fruit about $\frac{1}{4}$ in. long ; carpels 5, each with 2 patent horns.

Huilla.—In flower and fruit. No. **4704**.

Mossamedes.—On the red sandstone rocks of the Boca do Bera ; fl. and fr. July 1859. No. **4709**. On the sides of the mountains of Serra de Montes Negros ; fr. 10 August 1859. No. **4710**.

3. **H. arabica** Hochst. et Steud. in Pl. Schimp. n. 928 (Unio itiner. 1837), & ex Fischer Meyer et Avé-Lall. Ind. Sem. Petropol vi. Animadv. Bot. p. 9, n. 1279 (1840).

H. filipes Harv. in Harv. & Sond. Fl. Cap. i. p. 206 (1859-60) apud Masters, *l.c.*, p. 232. *H. modesta* Masters, *l.c.*, p. 232.

Bumbo.—In fields after crops of *Arachis hypogæa* L., near Bumbo ; fr. and late fl., most of the petals having fallen, Oct. 1859. No. **4706**.

Benguella.—An annual slender rather rigid herb, much branched from the base upwards ; flowers red-purple ; very abundant in open sandy stations around the city of Benguella ; in fruit and with a few flowers, June 1859. No. **4707**.

Mossamedes.—An annual herb, prostrate or ascending, branched from the base, scarcely 3 in. high ; flowers pendulous, of a pleasant deep red-carmine colour ; in dry sandy hilly stations at Saco de Giraul, also near S. Antonio ; fl. and fr. July 1859. No. **4708**. An erect or

ascending viscid annual herb, with bright carmine flowers; in sandy stations near the banks of the river Bero; fl. and fr. July 1859. No. **4711.** An erect or ascending, viscid, much branched, annual or biennial herb, with very elegant purple-vermilion flowers simulating those of an *Anagallis*; in sandy shortly-bushy stations and at the skirts of small woods, near Mata de Carpenteiros; fl. and fr., 1859. No. **4712.**

The species as here treated has its characters enlarged, and it includes *H.* (*Acicarpus*) *filipes* Harv. var. *elatior* K. Schumann in Verhandl. Bot. Brandenb. xxx. p. 235 (1888); Welwitsch's specimens appear to render this course imperative.

7. **MELOCHIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 223.

1. **M. corchorifolia** L. Sp. Pl. edit. 1, p. 675 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 236.

Icolo e Bengo.—In palm-groves near the river Bengo; fr. Dec. 1853. No. **4716.** Coll. Carp. 268.

Libongo.—An undershrub, 1½ ft. high, with the habit of a *Waltheria*, branched in an ascending manner from the base, the primary stem erect, the branches gradually shorter from the base towards the apex; leaves bi-stipulate; flowers crowded in terminal heads, whitish, yellow when dry; capsules 5-6-angled, 5-6-seeded; abundant, but seen only in one station at the marshy margins of a dried-up lake on the left bank of the river Lifune, in company with *Azolla pinnata* Br., etc.; fl. and fr. middle of Sept. 1858. No. **4717.**

2. **M. crinita** Br. ms. in Herb. Mus. Brit.

Cf. *M. melissifolia*, Masters, *l.c.*, p. 236, non *M. melissæfolia* Benth. in Hook. Journ. Bot. iv. p. 129 (1841).

An undershrub, 1½ to 2½ ft. high; stems erect, branched; branches terete, glabrescent or pubescent both with long spreading hairs and with short stellate hairs towards the apex; internodes short or ranging up to 1½ inch; leaves ovate, the lower ones rounder and the upper ones narrower, obtusely or rather acutely narrowed at the apex and rounded or truncate at the base, crenate-serrate or serrate on the margins, glabrescent except along the nerves or thinly scattered with simple appressed hairs, green on both surfaces, rather thin, ⅝ to 2 in. long by ¼ to 1 in. wide; petiole ranging up to ½ in. long, pubescent; stipules narrowly lanceolate, deciduous, shorter than the petiole; inflorescence axillary and subterminal, short, dense, pubescent, bracteate; bracts narrowly lanceolate, acute, unequal, pubescent with long spreading hairs, all shorter than the petals; flowers whitish, sessile or subsessile, ⅜ in. long; calyx ⅛ in. long, membranous, thinly pubescent; lobes from a broad base subulate, short; petals narrowly obovate, ⅜ in. long, glabrous; stamens ⅕ in. long, glabrous, exceeding the style-branches; filaments slender upwards, united at the base for nearly half their length; anthers narrowly lanceolate-oblong, $\frac{1}{20}$ in. long. Pistil ⅙ in. long; ovary hairy, terminated by a deeply 5-parted glabrous style; fruit subglobose, small, somewhat hairy, terminated by the remains of the style.

Ambriz.—In marshes near Mossul; fl. and fr. Nov. 1853. No. **4715.**
Pungo Andongo.—Fl. and fr. No. **4718.**

3. **M. Welwitschii** Hiern, sp. n.

Apparently a robust almost shrubby herb, divaricately branched; branchlets shaggy with long spreading hairs. Upper internodes ranging up to 2 in. long, mostly shorter than the leaves. Leaves ovate, the upper ones rather narrowly so, rather acute at the apex, rounded truncate or somewhat cordate at the base, serrate, scattered with appressed hairs on both surfaces, thin, 1 to 4½ in. long by ½ to 3 in. wide; petiole shaggy with long spreading hairs, ranging up to 1½ in. long; stipules linear-lanceolate, ⅓ in. long. Inflorescence axillary and subterminal, short, crowded; pedicels very short; bracteoles linear-filiform, long-ciliate, ⅓ to ⅔ in. long. Flowers white, ⅓ in. long; calyx ⅙ in. long, campanulate, thinly pilose, shortly 5-cleft; lobes from a broad base subulate. Petals obovate, glabrous, ⅓ in. long. Stamens ⅙ in. long, glabrous, falling short of the style-branches; filaments united for most of their length into a tube, adhering to the petals at the base; anthers oblong, about $\frac{1}{20}$ inch long. Pistil ⅕ in. long; ovary with long erect hairs below the deeply 5-lobed style. Fruit subglobose, ⅙ in. in diam., pilose, tipped with the remains of the style, longitudinally 5-furrowed, loculicidal. Seeds glabrous, $\frac{1}{10}$ in. long.

Cazengo.—In marshes by the small lake Logôa do Moambege, near Dalatando; fl. and fr. June 1855. No. **4719**.

8. **LEPTONYCHIA** Turcz.; Benth. & Hook. f. Gen. Pl. i. p. 237.

1. **L. urophylla** Welw. ex Mast. in Oliv. Fl. Trop. Afr. i. p. 238.

Golungo Alto.—An evergreen shrub, 3 to 4½ ft. high, occasionally attaining 6 ft., with patent branches; leaves coriaceous or chartaceous-membranous, rather hard, dull-green but little glossy and with impressed nerves above, very bright green, glossy and with raised nerves below; flowers greenish, hermaphrodite; calyx pentagonal-cylindrical, sepals 5, valvate in æstivation, deciduous; petals 5, alternate to and much shorter than the sepals, obovate-circular, whitish, tomentellous, erect, rather concave, somewhat cohering at their margins; capsule obovoid-clavate or clavate, of the size of a large hazel-nut, grey-tomentose all over, 3-4-celled, 3-4-valved. In the elevated dense very shady primitive forests of the Sobato de Bumba and of Quilombo, especially about Fontes de Capopa, abundant; fl. Jan. and beginning of August 1855. No. **1365**.

9. **WALTHERIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 224.

1. **W. americana** L. Sp. Pl. ed. 1, p. 673 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 235.

Loanda.—A perennial herb, with woody many-headed rootstock, erect branched virgate branches, and yellow flowers turning dark-purple in drying; on dry and rocky bushy plains, towards the south of the Loanda district, at Museque de Luiz Gomes, abundant; fl. July and August 1854. No. **4724**. A branched undershrub, 2 to 4 ft. high, with polymorphous leaves; in dry flat fields, almost everywhere throughout the district, abundant; at Imbondeiro dos Lobos, in flower-bud, March 1858. Nos. **4714**, **4723**.

Libongo.—An undershrub, 2 to 3½ ft. high; stems cæspitose at the base, afterwards virgately branched; flowers yellow; in rather moist thickets, at the banks of the river Lifune; fl. Sept. 1858. No. **4722**.

Golungo Alto.—A shrubby herb, branched from the base, 2 to 3 ft. high, erect; flowers yellow, at length fuscous when withering; in rather dry open stations, near Canaûlo, by the Ambaca road; fl. and immature fr. beginning of June 1856. No. **4721**. About Sange, fl. No. **4720**.

Huilla.—An undershrub, 2 to 3 ft. high, with numerous stems and yellow flowers; in rather moist thickets, near Humpata, sporadic; fl. April 1859. No. **4725**.

Theobroma Cacao L.—Prince's Island.—A small cultivated tree, 8 to 10 ft. high, with spreading branches; frequently cultivated in shady woods at elevations ranging from 300 up to 2000 ft. above sea-level; with ripe fr. Sept. 1853. No. **4713**. Coll. Carp. 287.

10. **BYTTNERIA** L. in P. Loefling Iter Hispan. p. 313 (1758); Benth. & Hook. f. Gen. Pl. i. p. 225 (*Buettneria*).

1. **B. africana** Masters in Oliv. Fl. Trop. Afr. i. p. 239 (*Buettneria*); var.? **angolensis**.

Golungo Alto.—An undershrub, woody at the base, climbing to a considerable height, and herbaceous above after the manner of a *Dioscorea*; leaves of a deep-green hue, glossy on both sides; flowers hermaphrodite; petals 5, white; stamens 5, opposite to the petals, situate in recesses of the urceolate disk, included, anthers 5; stigma hyaline, peltate, 6-lobed or 6-rayed; fruit as large as a good-sized walnut, nearly 1 in. in diameter, densely and rigidly echinate outside, very hard, spherical. In the primitive forests of Sobato de Quilombo-Quiacatubia, alongside the river Muio, fl. Feb. 1855; Queta, fr. end of Dec. 1856. No. **351**.

XXV. TILIACEÆ.

The Tiliaceæ, which embrace some of the most widely distributed plants in the Flora of Angola, occur for the most part only as bushes or herbaceous plants; during his travels in Angola and Benguella, Welwitsch never met with those genera, which nearer the Equator are represented by regular tree-forms; he thought, however, that on closer investigation such might be found in the more northern Congo district. It is a remarkable phenomenon that Tiliaceæ throughout the North Temperate Zone consist of trees; while the species which occur in tropical regions, especially in Africa, consist mostly of shrubs and frequently of herbaceous plants, the contrary relation of which holds in the case of most other Natural Orders.

The Tiliaceæ increase gradually from the coast to the interior of the country, not only in the number of species, but also in that of the individuals. The species of the genera *Corchorus* and *Triumfetta* are for the most part herbaceous, while those of the genera *Grewia* and *Glyphæa* comprise only shrubby forms or woody climbers. The genera *Corchorus* and *Grewia* preponderate in the littoral districts, while the species of *Triumfetta* are especially frequent in the region of primitive forests and high table-lands, and *Glyphæa* belongs exclusively to the interior highlands, chiefly in secondary woods. *Grewia* and *Triumfetta* form, in company with Malvaceæ, the principal part of the underwood in

the portions of forest which are richly clothed with trees, and on the margins of primitive woods; and they often occur in such abundance that they constitute dense thickets.

Many species of *Grewia* are, on account of the great elasticity of their branches, used for traps and occasionally for archers' bows; the elastic branches, especially those of *G. pilosa* Lam., are employed by the negroes for the lattice-gates of their huts as well as for the snares which are laid within their enclosures for catching birds and the smaller quadrupeds. The inner bark of nearly all the species supplies good ropes. The berries of some species are eaten by the negroes, who, however, when hungry will eat almost anything. The species of *Grewia* also furnish everywhere good firewood; when in flower they are an ornament to the margins of the forests, and when in fruit they appear to supply a delicacy to bees.

Some of the species of *Triumfetta* present themselves in such innumerable varieties and forms of transition that the limitation of the species, and still more so the even approximately correct arrangement or grouping of the varieties, becomes excessively difficult. On this account I have given, nearly in full, Welwitsch's notes; and in the determination of the species I have generally followed Dr. Masters. Several, with the Bundo name "Quibosa," are very useful by the tenacity of the fibres which their stems and inner bark furnish, and ropes are manufactured from them. In the mountainous districts of the interior three or four species are designated by this name: for example, *T. semitriloba*, *T. rhomboidea*, *T. orthacantha*. (See Welw. Apont. p. 559 under n. 138, and Synopse, p. 43, n. 119.)

The species of *Corchorus* are found principally in fields formerly cultivated and afterwards deserted, or as weeds among field-plants, and congregate in dense masses in the littoral regions around the sandy-loamy banks of the lakes, the artificial ponds (*represas*), and the smaller stagnant pools which after the rainy season occur everywhere, girt by a green border of herbaceous plants. Some species, especially *C. olitorius* L., are eaten by the negroes as a vegetable, a fact which, however, Welwitsch particularly observed only in Golungo Alto and by the river Luinha in the district of Cazengo. If it were possible to prove that *C. olitorius* L., a species which, as has been stated, occurs very frequently in Golungo Alto and is eaten there as a vegetable, is not indigenous but introduced, Welwitsch maintained that it could have been introduced only from Egypt, or at least from the North-east, but not from America, to which continent the majority of writers trace back all the plants of West Tropical Africa which are regarded as introductions.

1. **GREWIA** L.; Benth. & Hook. f. Gen. Pl. i. 233.

1. **G. caffra** Meisn. in Hook. Lond. Journ. Bot. ii. p. 53 (1843); Masters in Oliv. Fl. Trop. Afr. i. p. 244.

Grewia (sp.), Welw. Apont. p. 559, under n. 138.

Loanda.—An elegant tree-like shrub, 6 ft. high, with the habit of *Rhamnus Frangula* L., much branched in a divaricate manner. Native name "Mutamba" or "Itamba." It furnishes material for ropes and bows. In the rocky maritime parts of Praia de Zamba Grande, to the south-west of the city of Loanda, fl. Feb. 1854. No. **1373**.

2. **G. Avellana** Hiern, sp. n.

G. guazumifolia, Masters, *l.c.*, p. 245, quoad specimen Welw., non Juss.

Leaves broadly obovate-oval, subcuspidate, at the rather oblique base subcordate and 3-nerved, rather rough above with numerous elevated puberulous points, net-veined, scarcely paler and with less elevated puberulous points beneath, 2 to 3 by $1\frac{1}{4}$ to 2 in.; margins obtusely serrate and sub-repand; petiole about $\frac{1}{6}$ in. long, hairy; stipules subulate, suberect, $\frac{1}{4}$ in. long. Hairs mostly stellate. Fruit-peduncle leaf-opposed, pendulous, scarcely 1 in. long, bracteate at about two-thirds from the base; bracts subulate, rather shorter than the stipules. Fruit solitary, depresso-globose, nearly 1 in. diam., reddish, white-purple with white hairs at the apex; seeds pale orange.

Huilla.—An erect little shrub, 1 to $1\frac{1}{2}$ ft. high, or probably a secondary shoot of a stout shrub. In wooded rocky thickets in Morro de Lopollo, fr. middle of Dec. 1859. No. **4642**.

Represented in the British Museum by a single leaf and a drawing.

3. **G. megalocarpa** P. de Beauv. Fl. d'Ow. ii. p. 69, t. 102 (1807); Masters, *l.c.*, p. 245.

Huilla.—Branches much spreading and twisting; flowers whitish. In the rocky thickets of Morro de Lopollo; in flower, in company with *Sarcostemma*, Feb. 1860, in flower and very sparingly in fruit, in company with *Xylopicrum odoratissimum* O.K.; common at the beginning of April 1860. No. **1374**. A shrub, 1 ft. high, with several erect stems. In the elevated shortly bushy pastures of Empalanca, between Lopollo and Humpata, fl. April 1860. No. **1381**. A shrub, $\frac{1}{4}$ to 5 ft. high; flower white, large; fruit red; Feb. 1860. Coll. Carp. 289.

4. **G. lasioclada** Welw. ms.

G. inæquilatera Masters, *l.c.*, p. 245, *pro parte*, non Garcke.

A shrub, 4 to 5 ft. high; branches spreading, subglabrescent, towards the extremities clothed with pale-tawny woolly-cottony fringed or stelliform hairs; leaves oval- or obovate-oblong, shortly acute or obtuse at the apex, obtuse rounded or truncate and very oblique at the base, subglabrate (except the nerves) above, pale and closely beset with short stellate hairs beneath, thinly coriaceous, 2 to 3 in. long by 1 to $1\frac{2}{3}$ in. broad, serrulate with the serrations quasi gland-typed; petiole $\frac{1}{5}$ to $\frac{1}{4}$ in. long, hairy; stipules $\frac{1}{3}$ in. long, subulate at the apex, dilated about the middle, narrowed at the base, hairy on the back, deciduous; peduncles axillary, solitary or 2 or 3 together, hairy like the branchlets and petioles, $\frac{2}{3}$ to 1 in. long, bearing about 3 short pedicels at the apex and one or more ovate bracteoles $\frac{1}{8}$ to $\frac{1}{6}$ in. long; pedicels $\frac{1}{4}$ in. long or less; flowers yellow, rather large and fleshy; sepals linear-oblong, $\frac{1}{2}$ to $\frac{3}{5}$ in. wide; petals broadly obovate, notched at

the apex, half as long as the sepals; androecium nearly equalling the calyx, shorter than the glabrous shortly lobed style.

Bumbo.—Among shrubs half-way up the mountains of Serra da Xella, at Chaõ da Xella, sporadic; fl. Oct. 1859. No. **1382**.

The following probably belong here:—

Ambriz.—In rocky bushy places between Ambriz and Quisembo, fl. and fr. Nov. 1853. No. **1372**.

Loanda.—A small tree, branched from the base; branches elongate, spreading; branchlets virgate; or a robust shrub with habit of an *Alnus*, 6 to 8 ft. high; leaves rather hard-membranous; flowers yellow. In damp thickets between Quicuxe and Mutollo, fl. May 1854; and near Quicuxe, fl. end of July 1858. No. **1371**. Flowers deep yellow, fruits dull red. Among shrubs in the island of Cazanga, near Morro da Cruz (St. Catherina); fl. and fr. March 1858. No. **1371***b*. An almost prostrate shrub of 1 to 2 ft. In dry rocky somewhat bushy places near Bemposta; fl. Feb. 1858. No. **1371***c*.

Golungo Alto.—A shrub, 2 to 3 ft. high, cæspitose; perhaps fresh shoots from the stock of a little tree. At the banks of the river Luinha, in secondary thickets; without either flowers or fruits, July 1856. Nos. **4643**, **6726**.

5. **G. Chadara** Lam. Encyl. Méth. iii. p. 44 (1789).
G. populifolia Vahl.; Masters, *l.c.*, p. 246.

Bumbo.—A shrub, 4 to 6 ft. high, remarkably resembling *Betula*, much branched; branches sarmentose; fruit brick-red. In thickets at the borders of woods of Leguminosæ ("Unteate"), near Bumbo, 15° S. Lat., in ripe fruit, June 1860. No. **1378**.

6. **G. carpinifolia** Juss. in Ann. Mus. Par. iv. p. 91, t. 51, f. 1 (1804); Masters, *l.c.*, p. 247.
G. pilosa Masters, *l.c.*, p. 250, *pro parte*, non Lam.

Golungo Alto.—A much-branched shrub, 6 ft. high; branchlets thin, virgate; flowers yellow; rather rare by thickets near Camilungo, fl. March 1855. No. **1376**. A slender shrub or rarely a little tree, 4 to 15 ft. high, divaricately branched; younger stem and branches sub-cylindrical, densely verrucose; adult trunk obtusely quadrangular, deeply 4-furrowed, 8 to 12 in. diam.; spines strong, very hard, sometimes deflexed; branches and branchlets very slender, horizontally scandent; flowers saffron-yellow, rather small; frequent in secondary woods and thickets, cane-beds, etc., about Sange, Bango Aquitamba, Mussengue, etc., fl. and fr. April 1855, April, June and August 1856. Nos. **1369**, **6727**.

Cazengo.—A shrub, 8 to 10 ft. high; in the primitive woods of Cambondo, fr. June 1855. No. **4644**.

Pungo Andongo.—Sporadic in thickets by the roadside leading from the fortress towards Cambambe, fl. April 1857. No. **1370**.

7. **G. miniata** Mast. ms. in Study set.
G. cyclopetala Masters in Oliv., *l.c.*, p. 248, non Wawra in Wawra et Peyr. Sert. Beng. p. 18 (1860).

Bumbo.—A twisted shrub, 3 to 4 ft. high; leaves green above, white beneath; fruits cinnabar-red. In thickets at the borders of woods of "Unteate," near Bumbo, by the roadside leading to Quitibe de Cima; sparingly in fruit June 1860. No. **1377**.

It differs from Wawra's species, to which Dr. Masters had referred

it, by the smooth not scabrid branches, by the same difference in the upper surface, and by the broader shape, of the leaves, by the red and 3-celled, not white and 6-celled fruit, etc.

8. **G. herbacea** Welw. ms. in Herb.

G. venusta Masters, *l.c.*, p. 249, quoad specimen Welw., non Fresen.

A perennial herb, 1 to 4 ft. high, sometimes becoming somewhat shrubby, especially after the flowering and fruiting when the leaves have fallen; stems several from the woody rootstock, erect, sparingly branched or simple, more or less beset with stellate hairs or glabrate; leaves suborbicular or somewhat ovate, rounded or subapiculate at the apex, cordate or unequally rounded at the base, irregularly dentate, thinly coriaceous, palmately 5-7-nerved, venulose, scabrid above, more or less tomentose-hispid and somewhat tawny beneath, 2 to 6 in. long by $1\frac{3}{4}$ to $4\frac{3}{4}$ in. broad; petiole tomentose-hispid or hispid, $\frac{1}{2}$ to 1 in. long; stipules deciduous; inflorescence axillary, compact, shorter than or scarcely as long as the petiole, $\frac{3}{4}$ to $1\frac{1}{2}$ in. in diam., tomentose-hispid with tawny hairs; common peduncle very short; pedicels short or ranging up to $\frac{1}{3}$ in. long; flowers numerous, yellow; sepals spathulate, $\frac{1}{4}$ in. long; petals narrowly elliptical, $\frac{1}{5}$ in. long; stamens about equalling the sepals; ovary pilose-hispid; style glabrous, shorter than the petals, cleft at the tip; drupe turning red, 4-lobed; lobes 2-seeded.

Pungo Andongo.—Abundant, especially in sandy thickets, fl. Jan. (near Caghuy) and Feb., fr. April to Oct. 1857. No. **1368**.

Nearly related to *G. villosa* Willd. It is the herbaceous *Grewia* mentioned by Welwitsch in Journ. Linn. Soc. iii. p. 153.

9. **G. villosa** Willd. in Ges. Nat. Fr. Berl. Neue Schr. iv. p. 205 (1803); Masters, *l.c.*, p. 249; non Heyne.

Bumbo.—A rigid shrub, 3 to 4 ft. high; branches and branchlets divaricate; leaves rigidly coriaceous, nearly orbicular, sulcate-sculptured above. Sporadic in bushy places between Bumbo and Quitibe de Cima, with leaves nearly deciduous but without either fl. or fr. June 1860. No. **1380**. This determination is doubtful.

10. **G. pubescens** P. de Beauv. Fl. d'Owar. ii. p. 76, t. 108 (1807); Masters, *l.c.*, p. 250.

The following specimens apparently belong to this species:—

Bumbo.—An erect shrub, 4 ft. high, at the time of gathering mostly without leaves, but with a few flowers and young leaves. Among shrubs, half way up the Serra da Xella, at Chaõ da Xella, Oct. 1859. No. **1387**.

Huilla.—A shrub, 2 to 4 in. high, cæspitosely branched, dwarf on account of the annual burning of the country. In short and sparse thickets, between Nene and Lopollo, fl. Oct. 1859. No. **1388**. A shrub, 2 to 3 ft. high; stems several from one rhizome; branches patently diverging; flowers whitish. Among low shrub, in rocky places, in Morro de Lopollo, fl. Jan. 1860. No. **1379**.

11. **G. pilosa** Lam. Encycl. Méth. iii. p. 43 (1789), excl. syn.; Masters, *l.c.*, p. 250, *pro parte*.

Huilla.—A shrub of 4 to 6 ft., with quite patent and often sarmentose branches, distichous leaves, and yellow flowers. In the more elevated shrubby places, at the base of Morro de Lopollo ; fl. and young fr. end of Jan. 1860. No. **1375**.

12. **G. angolensis** Welw. ex Masters, *l.c.*, p. 251.

Golungo Alto.—Fruit pale brick-red. Not uncommon at the margins of woods, about Sange and Bango Aquitamba, fl. Dec. 1855 and April 1856, fr. June and August 1856. No. **1383**.

Pungo Andongo.—A small tree or arborescent shrub of 7 ft. ; branches patent, long-virgate, the lower ones almost sarmentose, the upper ones shorter and flowering ; flowers whitish-yellowish. In tall-bushy places between the fortress and Sobato Quilanga, fl. Jan. 1857. No. **1384**.

13. **G. floribunda** Masters in Oliv., *l.c.*, p. 252 ; non Wall.

Golungo Alto.—An arborescent shrub or small tree, 6 to 15 ft. high ; trunk 4 to 6 in. in diam. ; branches numerous, rather spreading ; flowers abundant, whitish, turning to a pale sulphur colour. Endocarp fibrous. In wooded thickets of the mountains of Zengas de Queta, Capopa, etc., fl. and fr. June 1855, March to July 1856. No. **1385**.

Pungo Andongo.—A handsome shrub, 6 to 8 ft. high, with whitish flowers. Sporadic in mixed secondary woods between the fortress and Luxillo, fl. and young fr. April 1857. No. **1386**.

Apparently the same species as *G. africana* Masters in Oliv., *l.c.*, p. 253, non Miller.

2. **TRIUMFETTA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 234.

1. **T. Welwitschii** Masters in Oliv. Fl. Trop. Afr. i. p. 255.

Pungo Andongo.—A precocious perennial herb ; stems several from a woody root-stock, erect, 1 to 3 ft. high, with the habit (when in leaf) of *Helichrysum* or *Epilobium*, simple or branched above ; flowers yellow ; capsules bright red, somewhat juicy ; prickles setaceous, slender, soft, patently pilose. Frequent in stony pastures and in rather dry bushy places, from the river Lutete to Candumba, fl. Jan. and Feb. 1857, fr. (scarce) Sept. and Oct. 1856. No. **1414**.

2. **T. geoides** Welw. ex Masters, *l.c* , p. 256.

Huilla.—A precocious undershrub, from a few inches to scarcely a foot in height. Sporadic and rather rare in rather dry shortly bushy pastures near Lopollo, in company with *Basananthe nummularia* Welw. and with species of *Thesium* and Thymelæaceæ, fl. Nov. and Dec. 1859, fr. Jan. and Feb. 1860. No. **1413**.

3. **T. annua** L. Mant. Pl. (i.) p. 73 (1767) ; Masters, *l.c.*, p. 256.

Pungo Andongo.—Flowers very small, of a deep orange colour. Rather rare in rocky thickets by Mata de Pungo, fl. (few) and fr. Jan. 1857. No. **1407**.

Huilla.—Sparingly in rather open woods between Lopollo and Monino, fl. and young fr. Jan. 1860. No. **1408**.

4. **T. semitriloba** Jacq. Pl. Carib. p. 22 (1760) ; Mast., *l.c.*, p. 256. *Triumfetta* (sp.) Welw. Apont. p. 590, n. 80.

Golungo Alto.—A shrub, 3 to 5 ft. high ; fibre very tenacious. At the borders of primitive woods of Sob. de Mussengue, not far from the stream Quiapoze, fl. and young fr. May 1855. No. **1426**. A shrub, 4 to 7 ft. high or even more, flowers saffron-yellow. Native name

"Quibosa." In the primitive woods of Sob. de Mussengue, frequent, fl. and fr. March 1856. No. **1427**. A shrub, 5 to 8 ft. high; stems cæspitosely crowded, usually erect or ascending, woody; bark very tenacious, ashy-green, roughish, used for making ropes; leaves tomentose beneath; flowers dark yellow; anthers and filaments dull yellow; prickles of the capsule hooked, armed with long hyaline pilose hairs. Native name "Quibosa." In dampish thickets, at the banks of the river Cuango near Camilungo, etc., very common, fl. and fr. May to July 1856. No. **1428**. Cf. Coll. Carp. 291. August. Coll. Carp. 290. In damp wooded places near Camilungo, Prata de Felix Simoẽs, fl. May 1855. No. **4647**.

The following, without either flower or fruit, probably belongs to the same species:—

Golungo Alto.—A gigantic herb with very thick striate stem and very ample leaves. Native name "Quibosa." Ropes, sacks, etc., are made from the fibre of its stem; 14 Dec. 1854. No. **4648**.

5. **T. pilosa** Roth, Nov. Sp. p. 223 (1821); Masters, *l.c.*, p. 257.

Golungo Alto.—In dampish, high-grassy thickets near Undelle, fl. and young fr. Feb. 1855. No. **1424**. An undershrub, 3 ft. high, patently branched (not yet fully developed); in wooded places near Quibixe, between Sange and Mussengue, fl. beginning of June 1856. No. **1425**. A sub-herbaceous undershrub, 3 ft. high, Mussengue path, fl. June 1856. No. **1425*b***.

Pungo Andongo.—In the little woods composed of a species of *Psidium*, in the island of Calemba, in the river Cuanza, fl. 12 March 1857. No. **1422**.

Bumbo.—A herb or undershrub, 3 to 4 ft. high, branching widely. Sporadic in dampish wooded and shrubby places in Chaõ da Xella, fr. Oct. 1859. No. **1421**.

Huilla.—An erect robust shrub, 5 to 6 ft. high; stems patently branched towards the apex. In shrubby woods, near the main river Monino in Matas do Monino, sparingly in fruit, without flowers, Jan. 1860. No. **1420**. An erect herb, scarcely to be called a shrub, at length virgately branched towards the apex. In tall-grassy places at the banks of stream Eme, fl. and young fr. April 1860. No. **1423**.

6. **T. rhomboidea** Jacq. Pl. Carib. p. 22 (1760); Mast., *l.c.*, p. 257.

Icolo e Bengo.—A patently branched herb, 2 to 3 ft. high; stem usually purplish; leaves of 2 or even 3 types of shape on the same plant; flowers yellowish. In marshy wooded places, at the river Bengo, near the Convent of St. Antonio and Funda, fl. and fr. Dec. 1853. No. **1429**. A suffrutescent herb, about 3 ft. high; stems erect; branches patent; leaves of one type of shape; fruit rather small, prickles hooded and at maturity naked. In palm-groves, composed of *Elaeis guineensis* and *Cocos nucifera*, along the river Bengo, near Quifandongo, and from St. Antonio to Prata, fl. and fr. (Dec. 1853 and) Sept. 1857. No. **1418**.

Cazengo.—In thickets along the banks of the river Luinha, fl. and young fr. June 1855. No. **1419**.

Golungo Alto.—Stems 2 to 3 ft. high, with different types of foliage from the same root. In wooded places along the stream Capopa, on the way to the spring of Capopa, near Sange, fl. and young fr. Dec. 1854. No. **1431**. A herb, woody at the base, 1 to 1½ ft. high; stem straight, divaricately branched above; flower golden-yellow. In open thickets along the river Cuango but in rather dry places, fl. and fr.

April 1855. No. **1434**. In thickets by the roadside at Menha Lula, fl. and fr. April 1855. No. **1438**. In cultivated parts of Arimo de Mariano near Sange, along the river Cuango, fl. April 1856. No. **1437**. Young plants July 1855. No. **1435**. An erect herb, 2 ft. high ; flowers yellow. In bushy places at the banks of the stream, Caghuy, fl. and fr. April 1856. No. **1440**. Flowers dark yellow ; leaves very soft. Sparingly at the borders of thickets along the road leading towards Quibixe, fl. April 1856. No. **1436**. In neglected places of cultivation, in the garden of the Governor at Sange, fl. and fr. June 1855. No. **1439**. An undershrub, 3 to 5 ft. high ; stem erect ; branches spreading or erect-spreading, slender, dark purple or green with purple spots ; flowers dull yellow, clove-scented. In reed-beds composed of species of *Andropogon*, *Panicum* and *Pennisetum*, along the river Delamboa, Sob. de Bumba, fl. and young fr. 6 June 1856. No. **1430**. An erect undershrub, 3 to 4 ft. high ; stem with spreading branches towards the apex. In reed-beds near Quibixe, fl. June 1856. No. **1430***b*. Queta, fl. August 1856. No. **1430***c*. An undershrub, 3 to 4 ft. high ; lower branches patent, upper ones erect-spreading ; lower surface of leaves sometimes only on the nerves, in other cases even on the same specimen over all parts woolly-cottony, sometimes also almost destitute of wool (perhaps a morbid condition) ; flowers yellow, almost of the colour of the yolk of an egg. In secondary woods near Quibixe, in Sob. de Bumba, fl. and young fr. June 1856. No. **1432**. An undershrub, 3 to 4 ft. high ; branches patent ; leaves sometimes densely white-tomentose, in other cases woolly only on the nerves and not rarely on the same individual altogether green, only shortly pilose or hirsute or pubescent on both surfaces. Native name "Quibosa." On rather dry bushy slopes of the mountains of Sob. Quilombo Quiacatubia, sporadic, fl. and fr. July 1856. No. **1433**. An undershrub, 3 ft. high. In hilly grassy places of the mountains of Serra de Alta Queta, fl. and fr. June 1856. No. **1433***b*.

Ambaca.—In fr. Sept. 1856. No. **6728**.

Pungo Andongo.—The specimens from this district are doubtfully forms of this species. On rocky hills between Caghuy and a place called No Mangue, not yet in flower Feb. 1857. No. **1417** (Cf. *T. orthacantha* Welw.). At the tall-grassy bank of the stream Casalalé within the stronghold, fl. Feb. 1857. No. **1441**.

Huilla.—A variety with 3-lobed leaves (*T. urenæfolia* Welw. ms.). An erect hard shrub, 3 to 5 ft. high, when without flowers wonderfully resembling a species of *Urena ;* flowers yellow. In tall-grassy meadows, at the skirts of woods, preferring damp spots, between Lopollo and Monino, fl. and young fr. Dec. 1859 and Feb. 1860. No. **1442**.

7. **T. glechomoides** Welw. ex Masters, *l.c.*, p. 258.

Huilla.—Flowers yellow. In bushy woods between Monino and the stream Eme, Matas de Monino, fl. and young fr. Dec. 1859 and end of Jan. 1860. No. **1409**.

8. **T. orthacantha** Welw. ex Masters, *l.c.*, p. 258.

A shrub or in secondary thickets an undershrub, 3 to 6 ft. high, with the upper branches hoary. Flowers straw-coloured or yellow-reddish. Native name "Quibosa."

Golungo Alto.—In dense thickets of primitive woods and amongst *Pennisetum* (Maiango), along the stream Quibôlo near Sange, April 1856 ; in flower. No. **1415**. In fruit. No. **1415***b*.

Pungo Andongo.—At the bushy margins of woods consisting of

Leguminosæ (Panda), along the banks of the river Luxillo, fl. and fr. March and April 1857. No. **1416**.

9. **T. setulosa** Masters, *l.c.*, p. 259.

Punco Andongo.—An annual herb, scarcely a foot high, branched from the base; branches ascending; leaves flaccid, usually purplish below; flowers small, orange-coloured; capsule-prickles not hooked but tipped stellately with small setæ. In bushy stony places between Caghuy and Mangue; fl. and fr. middle of April 1857, rather rare. No. **1410**.

Huilla.—In shortly bushy places along the borders of woods in Matas de Monino, fl. and young fr. April 1860. No. **1411**.

This differs from the last No., inasmuch as the hairs on the upper surface of the leaves are mostly stellate, whereas in No. 1410 (which constitutes the type of the species) the hairs are appressed and simple or nearly so.

Var. ? **paradoxa** (Welw.).

An annual erect slender herb; branches erect-patent, shaggy; leaves ovate-lanceolate, subobtuse, subapiculate, rounded at the base, thin, obtusely serrate, scattered with appressed subsimple hairs on both surfaces, 2 by 1 in. or larger; petiole $\frac{1}{2}$ to $\frac{4}{5}$ in. long, thinly shaggy, curved at the apex; fruit blackish, without wool amongst the prickles which are stellately tipped with short setæ, as in the type of the species.

Golungo Alto.—In hilly places of the mountains of Serra de Alta Queta, amidst species of *Pennisetum* and *Andropogon*, apparently very rare, fr. in March, April or May 1856. No. **1412**.

Perhaps a distinct species. With this should be compared a plant "Quiboça onene," Varsea do Isideo, June 1857. Coll. Carp. 292.

3. **CORCHORUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 235.

1. **C. olitorius** L. Sp. Pl. ed. 1, p. 529 (1753); Masters in Oliv. Fl. Trop. Afr. i. p. 262.

Loanda.—Capsules closely appressed to the stem. In somewhat bushy damp meadows, between Bemposta and Camama; fl. and young fr. May 1859. No. **1390**.

Icolo e Bengo.—In moist grassy situations by the river Bengo, near the Convent of S. Antonio; fl. and fr. Dec. 1853, not uncommon. No. **1390***b*.

Golungo Alto.—Stem purple; petals pale-yellow, obovate-spathulate, a little or scarcely exceeding the calyx. In groves of *Elaeis guineensis* Jacq., reed-beds, marshes, etc., along the rivers Cuango and Delamboa, and near Canaûlo by the Ambaca road; fl. and fr. March and April 1856. No. **1389**. Stem 3 to 5 ft. high, sometimes very bluntly angular; sepals red or purplish outside, concave, hooded-subulate at the apex; petals deep-yellow, wavy along the margin especially at the apex. Near Camilungo, rather scarce; fl. and fr. end of Dec. 1855. No. **1389***b*.

2. **C. trilocularis** L. Mant. Pl. (i.) p. 77 (1767); Mast., *l.c.*, p. 262.

Ambriz.—Mosul, fl. and young fr. Nov. 1853. No. **4645**.

Loanda.—A much-branched cæspitose undershrub, forming low thickets. In sandy sparingly bushy parts of the island Cazanga, between the city of Loanda and Morro da Cruz, fl. and fr. April 1854.

No. **1397**. Abundant around artificial ponds near Imbondeiro dos Lobos ; fl. and fr. July 1858. No. **1392**. In muddy places flooded in summer, near Penedo, frequent ; in ripe fr. August 1854. No. **1392***b*. An erect herb of 3 to 4 ft. In damp places between Mubebem and Quicuxe, fl. and fr. July and August 1858. No. **1393**. In damp places at the borders of deserted fields, near Bemposta ; fl. and fr. July 1858. No. **1393***b*.

Golungo Alto.—In bushy places along streams between Cambondo and Trombeta, but not common ; fl. and young fr. June 1855, No. **1399**. By ditches of the road to Ambaca, Cambondo ; fl. and young fr. July 1855. No. **1399***b*.

Ambaca.—In damp spots (at the time drying up), at the sandy banks of the river Lucala, near Passagem do Lucala ; fl. and fr. Oct. 1856. No. **1391**.

Benguella.—An undershrub, becoming woody at the base, with slender ascending-erect branches. In damp sandy bushy places between the city of Benguella and the river Catumbella ; fl. and young fr. June 1859, not common. No. **1396**.

Huilla.—In grassy tall-bushy rather shady places, along the river Eme and around the great lake Ivantâla ; fl. and sparing fr. Feb. 1860. No. **1398**.

3. **C. fascicularis** Lam. Encycl. Méth. ii. p. 104 (1786) ; Masters, *l.c.*, p. 263.

Golungo Alto.—Prostrate, branched from the crown of the root ; branches elongate. Rather rare, in muddy places flooded in summer dried up at the time of gathering, between Cambondo and Trombeta ; fr. June 1855. No. **1394**.

4. **C. Antichorus** Raeusch. Nomencl. Bot., edit. 3, p. 158 (1797) ; Masters, *l.c.*, p. 263.

Cape de Verde Islands.—St. Vincent ; in dry basaltic rocky places near Praia da Galé, sporadic ; fr. Sept. 1853. No. **1395**.

5. **C. acutangulus** Lam. Ency. Méth. ii. p. 104 (1786); Mast., *l.c.*, p. 264.

Golungo Alto.—A biennial prostrate herb ; stems more or less reddish ; sepals 5 ; stamens 8, golden-yellow as well as the anthers and style. Not uncommon in places left after cultivation and along the banks of the rivers Quiapoze and Coango, near Sange ; fl. and fr. June 1856. No. **1403**. In the Governor's garden, August 1855. [No specimen separated for the British Museum.] No. **1403***b*. In grassy marshy places near Camilungo ; fl. and young fr. March 1856. No. **1405**. An erect herb, ½ to 2 ft. high. In damp sandy places, flooded in the rainy season, in Sobato Cabanga Cacalungo, sparingly ; fl. and fr. Feb. 1855. No. **1405***b*. At the grassy shady banks of the river Delamboa, Sobato Bumba ; not yet fully developed, March 1855. No. **1406**. Varzea grande do Coango ; fr. end of May 1856. No. **4646**.

Ambaca.—In damp fields near the hills between Quibinda and Izanga ; fr. Oct. 1855. No. **1404**.

6. **C. tridens** L. Mant. Pl. alt. p. 566 (1771) ; Masters, *l.c.*, p. 264.

Native name "Quisanána" or "Quijanána." See Welw. Apont. p. 559, under n. 138. The tops of the stems and the leaves are eaten with palm oil by the negroes nearly throughout Angola.

Golungo Alto.—Frequent in dampish sandy grassy places near Praia de Zamba grande ; fl. and fr. Nov. 1857. No. **1400**. At the

sandy banks of the stream Delamboa, near Sange ; fl. and fr. May 1856. No. **1401**.

Pungo Andongo.—In dampish sandy sparingly grassy parts of the stronghold, rather rare ; fl. and fr. beginning of May 1857. No. **1402**. And near Caghuy ; fl. and fr. April 1857. No. **1402***b*.

4. **GLYPHÆA** Hook. f. ; Benth. & Hook. f. Gen. Pl. i. p. 237.

1. **G. grewioides** Hook. f. in Hook. Niger Fl. p. 238, t. 22 (1849) ; Welw. Apont. p. 589, n. 72 (*G. teucrioides*, by error) ; Masters, *l.c.*, p. 267.

Golungo Alto.—A robust shrub, much branched from the base, 8 to 12 ft. high or more ; leaves in shady places gigantic ; flowers deep-yellow, rather large. Not uncommon in the secondary woods of Sobato de Bumba, Bango, Quilombo, Mussengue and Queta, fl. and fr. March 1856. No. **1366**. An arborescent shrub, with the habit of a *Grewia* and hard-membranous leaves. Near N-delle, August 1857. Coll. Carp. 172.

The following No., of which no specimen was separated for the British Museum, probably belongs to the same species :—

A shrub, 8 ft. high ; branches lax, virgate-elongated.

Pungo Andongo.—Very rare on the tall-bushy slopes of the Serra de Pedras de Guinga, with ripe fruit May 1857. No. **1367**.

XXVI. LINACEÆ.

The indigenous Linaceæ consist of three species of *Hugonia* and an *Erythroxylon*. The species of *Hugonia* are fine shrubby climbers with a very peculiar habit, sometimes climbing on trees, at other times covering with dense bushes the slopes of rocks ; their yellow flowers look somewhat like those of *Linum flavum* L., but their glossy foliage consists of large coriaceous and evergreen leaves. The *Erythroxylon* which is met with in Pungo Andongo has its wood entirely white, whereas the species of this genus usually have the wood red. (See Welw. Apont. p. 566 under n. 161 and p. 561 under n. 146.)

Linum usitatissimum L. Sp. Pl. edit. 1, p. 277 (1753) ; Oliv. Fl. Trop. Afr. i. p. 269. Huilla.—Cultivated for the sake of its fibre and seeds, but rather rarely ; fr. May 1860. No. **1583**.

The axile margins of the carpels are glabrous, and the capsule but little exceeds the calyx ; the specimens therefore do not belong to the variety which was *Linum humile* Miller. Welwitsch, Apont. p. 566 under n. 161, states that this species is cultivated, although in limited quantity, in the neighbourhood of Pungo Andongo, chiefly on account of the application of its oily seeds for poultices.

1. **HUGONIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 243.

1. **H. Afzelii** Br. ex Planch. in Hook. Lond. Journ. Bot. vii. p. 525 (1848).

Var. **melanocalyx** (Welw.) apud Oliv. Fl. Trop. Afr. i. p. 271. *Hugonia macrocarpa* Welw. Apont. p. 585, n. 21.

Pungo Andongo.—A robust evergreen shrub, widely scandent-

decumbent over volcanic rocks ; leaves coriaceous ; flowers golden-yellow, large, pentamerous or rarely tetramerous ; petals contracted at the base to a pedicel-like claw, spotted above the claw with a dark-red callosity ; fruit a little juicy, almost as large as a cherry. In rocky thickets at the borders of the primitive forests of Mata do Pungo, near the fortress, in company with *Derris nobilis* Welw. (Herb. No. 1891), fl. Feb., fr. May 1857. No. **1586**. (Fruit subglobose, $\frac{1}{2}$ in. diam.) Coll. Carp. 293. Scarcely scandent but ascending. Coll. Carp. 294.

2. **H. angolensis** Welw. ex Oliv. Fl. Trop. Afr. i. p. 271.

Cazengo.—Inner sepals acutely lobed ; capsules ovoid, not spherical. In thin forests among tall bushes, at the base of the mountains of Serra de Muxaûla, rather sparingly, in company with *H. platysepala* Welw. Herb. 1588, *Rinorea castaneoides* var. *strictiflora* (Welw. Herb. 883), *Teramnus labialis* (Welw. Herb. 2187*b*), *Coffea*, etc. ; fl. and fr. June 1855. No. **1585**. Coll. Carp. 295.

3. **H. platysepala** Welw. ex Oliv. Fl. Trop. Afr. i. p. 272.

Golungo Alto.—A handsome shrub, shaped like a tree, 6 to 8 ft. high ; branches elongate, occasionally scandent ; outer sepals hairy outside, striate with raised nerves inside ; petals with golden-yellow hairs outside, glabrous inside. In groves of *Adansonia* on the left bank of the stream Cuango, near Sange, at the base of the mountains of Serra de Alta Queta ; fl. March and at the end of May, fr. end of July 1855 : specimens were gathered climbing on *Hannoa undulata* (Welw. Herb. 1707) and others on *Myristica*. No. **1584**. A climbing shrub with copious large yellow flowers, by the Cuango, fr. August 1855. Coll. Carp. 296. Fruit as large as a hazel-nut, waxy-yellow, glossy, mucronate. Mata Quisuculo in Sobato Bango, Feb. and Sept. 1856. Coll. Carp. 297.

The following specimen is perhaps a juvenile state of this species :—

Cazengo.—A luxuriant shrub, 4 ft. high, not yet in flower, gathered in the neighbourhood of No. 1585, in thin bushy woods at the base of Serra de Muxaûla, sporadic, June 1855. No. **1588**.

2. **ERYTHROXYLUM** P. Br. ; Benth. & Hook. f. Gen. Pl. i. p. 244 (*Erythroxylon*).

1. **E. emarginatum** Thonn. in Schum. Beskr. Guin. Pl. p. 224 (1827) (*Erythroxylon emarginatus*) ; Oliv. Fl. Trop. Afr. i. p. 274 (*Erythroxylon*).

Pungo Andongo.—An elegant erect small tree, with the habit of *Buxus sempervirens*, or a robust shrub, as tall as a man, densely branched and twiggy ; branches and twigs densely leafy ; leaves sub-distichous, shining, much paler beneath ; stipules broad, semi-amplexicaul, very acute at the tip, $\frac{1}{24}$ to $\frac{1}{16}$ in. long, scarious, bi-carinate ; wood white ; flowers whitish, usually clustered along the middle part of the young shoots ; pedicels subacutely angular, $\frac{1}{6}$ to $\frac{5}{24}$ in. long ; calyx-lobes triangular, sub-carinate ; petals obovate-oblong, with a broad obtuse claw ; staminal-tube nearly equalling the calyx ; styles 3, free, scarcely clavate, as long as the stamens ; drupe scarlet, ovate-oblong, smooth, but little juicy ; seed of like form, striate with prominent longitudinal nerves. In the more elevated damp rocky places within the stronghold, at Pedra de Cazella ; fl. Feb. and April, fr. middle of Jan. 1857. No. **1587**. Coll. Carp. 298.

XXVII. MALPIGHIACEÆ.

1. **SPHEDAMNOCARPUS** Planch. ex Benth. & Hook. f. Gen. Pl. i. p. 256.

1. **S. angolensis** Planch. ex Oliv. Fl. Trop. Afr. i. p. 279.
Acridocarpus angolensis Juss.; Welw. Apont. p. 561 under n. 145.

Huilla.—A very stinging small shrub, subscandent or erect, with bright yellow flowers resembling those of a *Cistus*; a narrow-leaved form mixed with the ordinary one. Frequent in the lower thickets and exposed grassy places throughout Lopollo, from Humpata to the great lake of Ivantâla, fl. Nov. and Dec. 1859, fr. Jan. 1860. No. **1043**. A sub-sarmentose undershrub, 3 ft. high, flowering throughout the season, fruiting in May and June; the hairs on the fruit sting badly. Coll. Carp. 52.

The following imperfect specimen apparently belongs to the same species:—

Huilla.—Sparingly in hilly rocky bushy places, adorned with numerous Acanthaceæ, from the lake of Ivantala in the direction of Quilengues, in young fl. end of Feb. 1860. No. **1044**.

2. **TRIASPIS** Burch.; Benth. & Hook. f. Gen. Pl. i. p. 259.

1. **T. macroptera** Welw. ex Oliv. Fl. Trop. Afr. i. p. 281 (*macropteron*).

Golungo Alto.—A shrub, 5 to 6 ft. high, occasionally scandent; leaves herbaceous, rather glossy; petals imbricate in æstivation; stamens 10, 5 taller than the rest; filaments violaceous, linear-flattened, slightly incurved; anthers cordate-ovate; pollen golden, juicy. Rather rare, in thickets between Sange and Camilungo, fl. May 1855. No. **1038**.

Cazengo.—A shrub, 4 to 5 ft. high, with twisted branches. Occasional, in the sparse stony thickets at the base of the mountains of Serra de Muxaûlo, fr. June 1855. No. **1037**.

Pungo Andongo.—A stout shrub, climbing to a great height, with pendulous branches and branchlets, leaves subcoriaceous. In wooded places at the borders of primitive forests in Mata de Pungo, within the stronghold, fl. and fr. April 1857. No. **1039**.

The following is doubtfully referred here; the leaves have their bases narrowed:—

Pungo Andongo.—An arborescent shrub or probably a mutilated tree, with tortuous branches and branchlets and membranous leaves. Barranco de Pedra S. Antonio; without fl. Jan. 1857. No. **6740**.

2. **T. lateriflora** Oliv. Fl. Trop. Afr. i. p. 281.

Pungo Andongo.—A shrub of 6 ft. showing a climbing tendency, with the upper branches subscandent or erect. In stony places at the margins of primitive woods, near Pungo Andongo by the way leading towards Candumba, fr. June 1857. No. **1041**.

Bumbo.—A widely climbing shrub; flowers bright rose-coloured. In wooded thickets along the base of Serra da Xella, frequent, fl. and fr. Oct. 1859, at an elevation of about 2000 ft. No. **1042**.

3. **FLABELLARIA** Cav.; Benth. & Hook. f. Gen. Pl. i. p. 259.

1. **F. paniculata** Cav. Diss. p. 436, t. 264 (1790); Oliv. Fl. Trop. Afr. i. p. 282.
Heteropteris (sp.) Welw. Apont. p. 561, under n. 145.

Golungo Alto.—A robust arborescent shrub, attaining the height of 40 to 50 ft., often climbing ; trunk straight or twining, 4 in. or more in diam. at the base, unbranched below, tortuously branched above ; branchlets nodose and verrucose. Leaves dryly coriaceous, pale green but little shining above, beneath clothed with a silky tomentum shining like silver ; petioles of the younger leaves furnished with two rows of tumid glands. Flowering specimens rarely met with. Wood polycentric, variegated with yellow and brown. In dense primitive woods of Sob. de Mussengue, along streams, near Quibanga, not common, fl. 16 Dec. 1855. No. **1040**. Quiquele-quele, without flowers, August 1856. No. **5401**.

XXVIII. ZYGOPHYLLEÆ.

Along the whole coast of Angola from the Congo to the Cuanza no species of *Zygophyllum* occurs, but around Benguella *Z. simplex* becomes extremely frequent and extends to Cabo Negro in multifarious forms ; about Loanda *Tribulus terrestris* L. is frequent and takes the place of the former ; about Mossamedes an annual herbaceous prostrate form, not unlike a small-leaved *Portulaca*, occurs. *Tribulus terrestris* L. is frequent along the whole coast, but soon ceases to occur towards the interior of the country ; Welwitsch found none either in Golungo Alto or Huilla ; the varieties are exceedingly pretty in summer in consequence of the quantity of their flowers which are of a sulphur or golden colour ; but they are at the same time extremely troublesome to the bare-footed negroes on account of their sharp prickly fruits ; all the varieties are known by but one name in Angola.

1. **TRIBULUS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 264.

1. **T. terrestris** L. Sp. Pl. edit. 1, p. 387 (1753) ; Oliv. Fl. Trop. Afr. i. p. 283.

T. cistoides L., *l.c.* ; Welw. Apont. p. 591, n. 99, and in Journ. Linn. Soc. v. p. 184 (1861) ; *T. micans* Welw. Apont. p. 566, under n. 159.

Barro do Bengo.—In damp sandy places, drying up at the time of collection, by the river Bengo, near Cacuaco, fl. and fr. at the end of March 1854. No. **1575**.

Loanda.—Frequent in damp and in dry fields also by road-sides, near Quicuxe, fl. and fr. April 1854. No. **1576**. Very common and variable, in hilly grassy sandy-earthy places near Loanda, Alto das Cruzes, etc., Jan. and Feb. 1858 ; also in the city of Loanda June 1859. No. **1577**. A prostrate-ascending undershrub, with several brittle stems. Sporadic in dry rocky places between Boa Vista and Cacuaco, fl. and fr. March 1854. No. **1578**. An erect or ascending shrubby herb, 2 to 3 ft. high ; branches long, spreading, sulcate-striate ; leaves 8 to 10—usually 9—jugate, silky-shining beneath ; leaflets oblong-lanceolate, acuminate ; petals bright yellow, 1 in. long, 4 or 5 times as long as the calyx ; carpels 5, with 2 or 4 spines in the middle, hispid, 3 or 2-seeded ; style much shorter than the pyramidal stigma or nearly obsolete. Abundant in dry sandy situations, along the shore of the island Cazenga, between the city and the mouth of the river Cuanza ; fl. and fr. March 1858. No. **1579** and Coll Carp. 299.

Mossamedes.—Not common, in sandy grassy places at the banks of

the river Bero and in neighbouring gravelly places, near Cavalheiros, fl. and fr. July 1859. No. **1580**. Very sparingly in gravelly places exposed to the inundations of the river Bero, at Boca do Bero, fl. and fr. August 1859. No. **1581**.

Cape de Verde Islands.—A little shrub, branched from the base, with yellowish wood. In rocky maritime places near Villa de Praia in the island of St. Jago, fl. and fr. Jan. 1861. No. **1582** and Coll. Carp. 300.

These specimens of Welwitsch confirm Oliver's treatment of them as all belonging to one variable species, and further make it difficult to keep up the variety *β. cistoides* without at the same time admitting other varieties.

2. **ZYGOPHYLLUM** L.; Benth. & Hook. f. Gen. Pl. i. p. 266.

1. **Z. simplex** L. Mant. Pl. (i.) p. 68 (1767); Welw. in Journ. Linn. Soc. v. p. 183 (1861); Oliv. Fl. Trop. Afr. i. p. 285.

Z. portulacoides Forsk. Fl. Ægypt.-Arab. p. lxvi. n. 230, p. cxi. n. 279, p. 88 n. 67 (1775). *Z. stellulatum* Chr. Sm. in Tuck. Congo, p. 250 (name only, 1818).

Benguella.—Disk patelliform, a little concave, rather thick; margin stellately dentate. A densely bushy grass-green shrub, 1 to 1½ ft. high, with yellow flowers and cylindrical rather obtuse leaves. Very common in sandy maritime places, especially in those flooded by rain, Bahia dos Elefantes from the city of Benguella as far as Cabo Negro; fl. and fr. June and July 1859. No. **1568**. An erect dichotomously branched annual herb, scarcely a span high, with linear fleshy almost terete leaves. In rather shady sandy-earthy spots behind the city of Benguella, in company with an *Eragrostis*; fl. and fr. end of June 1859. No. **1571**.

Mossamedes.—Prostrate after the fashion of *Portulaca oleracea*, with cylindrical bright orange-coloured stems. Very common in dry sandy hilly maritime places among species of leafless *Euphorbia* and of *Sarcostemma* near the town of Mossamedes; fl. and fr. June and July 1859. No. **1569**. An erect form; whole plant rather fleshy; stem corymbosely branched from the base. Sparingly in dry sands between Mossamedes and Cavalheiros, in company with *Vogelia africana* Lam. (Welw. Herb. 519); fl. and fr. July 1859. No. **1570**. Stems several from the same rootstock, obliquely erect, somewhat flexuous and woody, pale reddish; leaves half the length of those in the prostrate form. Occasionally in sandy hollows near the sea-coast, at Cazimba, between Mossamedes and Cabo Negro, in company with *Merremia multisecta* Hallier (Welw. Herb. 6112); fl. and fr. beginning of Sept. 1859; a small-leaved variety. No. **1573**. In damp sandy places along the banks of the river Bero, near the town of Mossamedes; young plants not yet in flower, with long narrowly linear fleshy leaves; probably belonging to this species, August 1859. No. **1572**.

Cape de Verde Islands.—Occasional, in rocky maritime places, in the island of St. Jago, near Villa da Praia; fl. and fr. Jan. 1861; a small-leaved variety. No. **1574**.

2. **Z. orbiculatum** Welw. ex Oliv., *l.c.*, p. 285; Welw. Sert. p. 19. *Zygophyllum* (sp.), Welw. in Journ. Linn. Soc. v. p. 183 (1861).

A fleshy shrub, 1 to 2½ ft. high; stems numerous from a widely creeping rootstock, oblique or nodding, woody at the base, cylindrical, dichotomously branched; branches jointed, gradually

thickened towards the nodes; leaves very large, orbicular or spathulate-orbicular, smooth, very thick, glaucous-pruinose, entire, standing vertical on the living plant so as to be least affected by the sun; stipules interpetiolar, simple, broadly ovate, obtuse, 3 to 4 lines long, somewhat thinner in substance than the leaves; peduncles 2 to 5 together, rather erect, arising from the axils of the stipules; calyx green, fleshy; petals spathulate, longer than the calyx, white, deciduous; stamens 10; scales of the filaments thinly membranous, white, fringed at the apex, quasi-sheathing the filaments and equally long; gynophore disciform, somewhat concave; ovary oblong- or subclavate-pentagonal, 5-celled, with obtuse angles; ovules 2 to 5 in each cell; style pentagonal-pyramidal; stigma thinly papillose.

Mossamedes.—In sandy and stony places from Mossamedes to Cabo Negro, in company with Sesameæ, *Z. simplex*, and *Vogelia africana* Lam. (Welw. Herb. 519); fl. and fr. June and July 1859; very abundant. No. **1637**. In dry rocky places between Cazimba and Cabo Negro, sporadic; fr. Sept. 1859. No. **1637***b*. In maritime sandy places near Mossamedes; fr. June 1860. Coll. Carp. 27.

Upon the roots of this plant Welwitsch found *Hydnora africana*, var. *longicollis* Welw., growing as a parasite (see Welw. Sert. p. 66).

3. **Z. Fontanesii** Webb, Phyt. Can. i. p. 17, t. 1 (1836-40); Schmidt, Beitr. Fl. Cap. Verd. Ins. p. 314 (1852).

Cape de Verde Islands.—A hard distorted shrub, 1 to 1½ ft. high, fleshy. Leaves bifoliolate; leaflets opposite, obovate-elliptical, glaucous, quickly falling off in drying. In sandy maritime places in the island of St. Vincent, at Praia de Galé, without flowers, beginning of Sept. 1853. No. **1567**.

3. **FAGONIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 267.

1. **F. cretica** L. Sp. Pl. edit. 1, p. 386 (1753); Schmidt, Beitr. Fl. Cap. Verd. Ins. p. 313 (1852); Oliv. Fl. Trop. Afr. i. p. 287.

F. Oudneyi Br. in Denh. & Clapp. Trav. Append. p. 230 (name only, 1826).

Cape de Verde Islands.—On the slopes of Monte Verde near Port. de Mindello, in the island St. Vincent, without either flower or fruit, sparingly, Sept. 1853. No. **4593**.

XXIX. GERANIACEÆ.

Oxalis corniculata L. abounds in cultivated places and in moist lands of the hilly region; the other species of Oxalideæ which are met with in Angola proper belong to the genus *Biophytum*, and are peculiar to the highland region, where they grow on slopes covered with short grass in the neighbourhood of streams. Both species of *Biophytum* are interesting on account of the great sensitiveness of their leaves, which when irritated do not fall downwards, but raise themselves from their horizontal position into a kind of ball; the motion therefore is centripetal, and not centrifugal as in Mimosæ; at the least touch, or even when disturbed by the footsteps of persons passing close by, the leaflets instantly

fold themselves inwards and then share the upward motion of the petioles; the same position is taken up during the sleep of the plant. Brown in the Appendix to Tuckey's Congo, page 433, alludes to the property of irritability in this group of plants. *Impatiens Balsamina* L., called by the Portuguese "Papagaios" or "Melindres," is cultivated by some horticulturists, and the climate of Angola does not disagree with it (see Welw. Apont. p. 567, under n. 163); but no specimen is preserved in his herbarium.

1. **MONSONIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 271.

1. **M. biflora** DC. Prodr. i. p. 638 (1824); Oliv., *l.c.*, p. 290.

Huilla.—An annual herb, branched from the base, suberect, nodosely inflated at the insertion of the leaves, musk-scented combined with an acid-aromatic odour; petals white or somewhat purple, truncate; stigmas 5, elliptical, dark purple, stigmatose on the inner (top) surface; seeds dark brown, obovate-clavate; cotyledons green, exalbuminous, foliaceous, flexuous; radicle descending. In exposed situations near dwellings and in neglected plots of cultivation, about Lopollo and in the direction of Quilengues, frequent; fl. and fr. 27 Jan. 1860. No. **1606**.

2. **SARCOCAULON** Sweet; Benth. & Hook. f. Gen. Pl. i. p. 272.

1. **S. mossamedense** Hiern.

Monsonia mossamedensis Welw. ex Oliv. Fl. Trop. Afr. i. p. 290.

Mossamedes.—A small prostrate shrub; stem and branches resinous-fleshy, very rigid, readily inflammable even in the living state; bark greyish—sometimes reddish—in old age often chalky-white; the older stems bristling with the conversion of the stipules and petioles into spines, the very old ones unarmed and glabrate or smooth; petals connivent in a campanulate manner, lilac-purple or rose-coloured, varying in size; stamens and stigmas pale blue. On stony chalk hills, sparingly grassy, at an elevation of 100 to 200 ft. above the sea, in Serra de Montes Negros to the east of Mossamedes, fl. 10 August 1859. No. **1607**.

S. Marlothii Engl. Jahbr. x. p. 31, t. iv. fig. A (1888) differs by obtuse not apiculate sepals.

3. **PELARGONIUM** L'Hérit.; Benth. & Hook. Gen. Pl. i. p. 273.

1. **P. flabellifolium** Harv. in Harv. & Sond. Fl. Cap. i. p. 277 (1860), non Sweet; var. **benguellense** Welw. ex Oliv. Fl. Trop. Afr. i. p. 294.

Huilla.—Scapes about 6 in. high, somewhat branched near the base; petals remarkably fragrant in the evening, tubular-connivent. In the sandy parts of rather open mixed woods, in Matas de Monino, between Lopollo and the river Monino, sporadic, sparingly with flowers in Oct. 1859, (fr. and) adult leaves Jan. 1860. No. **1605**.

The type of the species, to a variety of which Professor Oliver referred this plant, belongs to the Transvaal, Natal, and the Orange Free State; Welwitsch regarded his plant as perhaps a distinct species.

Tropæolum majus L. occurs occasionally in abundance in neglected spots of cultivation and subspontaneously about the colony of Lopollo, without doubt originally introduced with seeds of culinary vegetables; it thrives well in the climate of Huilla; fl. Dec. 1859. No. **1619**.

4. **OXALIS** L.; Benth. & Hook. f. Gen. Pl. i. p. 276, *pro parte.*

1. **O. punctata** L. f. Suppl. Pl. p. 243 (1781).

Var. **glabrata** Sond. (?) in Harv. & Sond. Fl. Cap. i. p. 335 (1860), Oliv. (!) Fl. Trop. Afr. i. p. 295.

Huilla.—Bulb angular, reticulate-foveolate between the angles; scapes glabrous, twice as long as the leaves; calyx-segments bicallous at the apex. Abundant in sandy-earthy places among short grass, in company with *Isoëtes* and *Eriocaulon*, at 5000 to 5500 ft. elevation, on the top ranges of Morro de Lopollo and Empalanca; fl. Jan. and Feb. 1860. No. **1614**.

2. **O. semiloba** Sond. in Harv. & Sond. Fl. Cap. i. p. 350 (1860); Oliv. Fl. Trop. Afr. i. p. 296.

Huilla.—Leaves not ciliate; glands at the apex of the sepals very conspicuous, orange-yellow, bipartite. On the shortly grassy spongy wooded slopes at the left bank of the river Monino, at an elevation of about 5000 ft.; at the beginning of April 1860, not common. No. **1615**.

3. **O. corniculata** L. Sp. Pl. edit. 1, p. 435 (1753).

Var. **stricta** Oliv. Fl. Trop. Afr. i. p. 297.

O. stricta L., *l.c.* *Oxalis* (sp.) Welw. Apont. p. 567 under n. 162.

Prince's Island.—Sporadic on the slopes of Pico de Papagaio, at an elevation of between 3000 and 4000 ft.; fl. Sept. 1853. No. **1608**.

Loanda.—Rather rare, in gravelly places along the borders of fields between the city of Loanda and Quicuje, fl. and fr. May 1854. No. **1609**.

Golungo Alto.—Form with the root of the young plant filiform, of the older tubercular napiform perennial, and with weak spreading very brittle branches. Very common, near Sange, in neglected and cultivated fields, especially in plantations of *Saccharum* and *Musa*, quasi-scandent; fl. and fr. Sept. 1854 and July 1855. No. **1610**.

Huilla.—Forms with corolla twice or never twice as long as the calyx, closed in full sunlight. Not uncommon, in the damp wooded bushy parts of Monino and in neglected fields amidst grasses near Lopollo; fl. and fr. Jan. and April 1860. No. **1611**.

5. **BIOPHYTUM** DC. Prodr. i. p. 689; *Oxalis* Benth. & Hook. f. Gen. Pl. i. p. 276, *pro parte.*

1. **B. sensitivum** DC. Prodr. i. p. 690. *B. Umbraculum* Welw. Apont. p. 567 under n. 162 and p. 590, n. 87. *Oxalis sensitiva* L. Sp. Pl. edit. 1, p. 434 (1753); Oliv. Fl. Trop. Afr. i. p. 297.

Pungo Andongo.—Differs from the ordinary form of the species by shorter leaf-stalks, by solitary crowded peduncles or occasionally elongate and then with pedicels shorter than the calyx, by 5-nerved subulate-acuminate sepals much longer than the capsule, by opaque densely muricate seeds, and by habit and thicker stem. Annual, growing in dense crowds; flowers yellowish-orange or wine-yellow, at length placed at the base of the petioles and very rarely congregated in a pedunculate umbel. In hot wooded pastures and meadows, in dry and also in moist situations, near Caghuy 6 Feb. 1857, also near Sansamanda at the river Cuanza and near Condo Feb. and March 1857; fl. and fr. abundant. No. **1612**. A luxuriant form, near Sansamanda in shortly grassy meadows along the banks of the Cuanza; fl. March 1857. No. **1612***b*. In rather damp hot places near the rivulet Casalalé, fr. May 1857. Coll. Carp. 301.

2. **B. abyssinicum** Steud. in Hb. Schimp. Abyss. ii. n. 1206; A. Rich. Fl. Abyss. i. p. 122 (1847).

Oxalis abyssinica Oliv. Fl. Trop. Afr. i. p. 297.

Pungo Andongo.—A very slender erect annual herb, stem 3 to 12 in. high, reddish, towards the apex somewhat thickened and bearing an elegant palm-like crown; leaves remarkably sensitive; leaflets in 4 to 10 pairs, veiny on both surfaces, glaucescent beneath; peduncles very slender, about as long as the leaves; pedicels umbellate, almost capillary, in flower $\frac{1}{12}$ to $\frac{1}{8}$ in. long, in fruit $\frac{1}{6}$ to $\frac{1}{5}$ in. long; flowers yellow, small; sepals 3-nerved, shorter than the capsule. Rather rare, on the lower exposed shortly grassy slopes of the mountains of Pungo Andongo, along the stream Casalalé, between the fortress and Caghuy; fl. middle of Jan. and Feb. and near Catete; fr. April 1857. No. **1613**.

Welwitsch, Apont. p. 567, under n. 162, refers to this plant by the name of *Biophytum sensitivum* DC.

6. **IMPATIENS** L.; Benth. & Hook. f. Gen. Pl. i. p. 277.

1. **I. capensis** Thunb. Prodr. Pl. Cap. p. 41 (1794); Hook. f. in Oliv. Fl. Trop. Afr. i. p. 300.

Pungo Andongo.—An annual erect tender slender herb, 1 to $1\frac{1}{2}$ ft. high; rhizome creeping; stem more or less decumbent at the base or even rooting, cylindrical, very succulent, purplish; leaves membranous, rather flaccid, somewhat fleshy, bright green, crenate-serrate, with a long obtuse acumen at the apex, on long slender petioles; flowers rose-coloured, rather small, quickly marcescent; peduncles capillary; capsule oblong, rather curved, attenuate at the ends, very bluntly 5-angled; seeds obovate, villous, rather compressed, whitish. Rather rare, in shaded rocky places within the stronghold of Pungo Andongo and in Serra das Pedras de Guinga, fl. and fr. Nov. and Dec. 1856 and March 1857. No. **1618**.

2. **I. Kirkii** Hook. f. in Oliv. Fl. Trop. Afr. i. p. 300.

Var. β, Hook. f., *l.c.*, p. 301, **hypoleuca** Welw. ms. (sp.).

Ambaca.—Perennial, with the habit of *Impatiens latifolia* L.; stem decumbent, rooting at the nodes; ascending portion 1 ft. high, suberect, cylindrical, turning red, thinly scattered with subscarious hairs; leaves alternate, broadly lanceolate, $2\frac{1}{2}$ to 3 in. long, somewhat acuminate or apiculate, abruptly attenuate at the base, very bright green above, glaucescent-whitish beneath, serrate, the serratures sometimes extending to the petiole; petioles of the lower leaves $\frac{1}{2}$ in. long, of the upper leaves gradually shorter; flowers very bright rose-purple, rather large; peduncles axillary, solitary or 2 together, 2 to 3 in. long, the fruiting ones spreading or even very patent; spur longer than the rest of the flower or equalling it; capsule linear-oblong or elliptical. Sparingly at the spongy margins of streams, about Izanga; fl. Oct. 1856. No. **1616**.

Cazengo.—At the spongy banks of the small lake Lagoã do Moambege near Dalatando; fl. June 1855. No. **1617**.

Occurs also in the district of Golungo Alto, according to Welwitsch, Apont. p. 567, under n. 163.

XXX. RUTACEÆ.

With the exception of *Ruta graveolens* L., which is cultivated and also nearly wild in the district of Mossamedes, this natural order in Angola is composed almost entirely of trees, and often of

large trees with a magnificent habit, which dominate the surrounding vegetation with their beautiful crowns of glossy foliage, and which bear some resemblance to our ash trees; the trunks of these large trees are almost always armed with sharply pointed tubercles; and the timber of all the species is of excellent quality and is not unfrequently penetrated with a yellow colour. They are more abundant in the hilly region than in the highlands, where they diminish rapidly in number both of species and individuals.

The tribe Aurantieæ is sparingly represented in the indigenous flora of Angola; two or three species of the genus *Clausena*, arborescent shrubs, with pinnate leaves, white or pale flowers and aromatic pea-shaped fruits, were met with in the hilly and highland regions. The Lemon is occasionally found wild in the midst of woods, but only in stations where there have been villages in former times. Oranges and lemons are commonly cultivated throughout the province; less frequently the Sweet Lime and the Citron, which, however, are occasionally seen in gardens. Speaking generally, the cultivation of these very valuable trees in this country as yet leaves much to be desired, since the successive improvement of the different varieties by means of grafting is almost unknown. (See Welwitsch, Apontamentos, pp. 560-61, 565-66.)

1. **RUTA** L.; Benth. & Hook. f. Gen. Pl. i. p. 286.

1. **R. graveolens** L. Sp. Pl. edit. 1, p. 383 (1753); Oliv. Fl. Trop. Afr. i. p. 304.

Mossamedes.—An undershrub, 1½ to 2 ft. high, almost a little shrub. Formerly cultivated, but wild or apparently so, among garden-crops and along the stony margins of cultivated fields; fl. and fr. Sept. 1859; also in rough rocky situations in the neighbourhood of gardens, in July 1859. No. **1620**.

2. **ZANTHOXYLUM** L.; Benth. & Hook. f. Gen. Pl. i. p. 297.

1. **Z. macrophyllum** Oliv. Fl. Trop. Afr. i. p. 304.

Golungo Alto.—Trunk 9 to 12 in. in diam. at the base; crown palm-shaped, very elegant; trunk, branches, and rachis and petiole of the leaves armed with hard and acute spines; flowers (sub-)terminal, thyrsoid, greenish. In Sobado de Bumba by rivulets; with flower-buds in Oct., immature fr. Jan. 1856. No. **4557**. Coll. Carp. 302. Trunk 18 to 24 in. in diam. at the base, tuberculate-spinous, straight, branchless below, above with erect-spreading densely spinous branches, crowned with palm-like head at the apex; flowers (sub-)terminal, paniculate, yellowish-greenish. Native name "Paco bálo." Not uncommon in dampish wooded situations in Sobato Bumba; fl. March 1856. No. **4564**. A tree, 30 to 60 or even 80 ft. high; trunk straight, 12 to 18 in. in diam. and probably becoming thicker, from the base up to the apex bristling with prickles. Native name "Paco ballo." In the dense more elevated primitive forests of Sobato de Bango Aquitamba and Quilombo; Mata de Quisuculo, with foliage but without flowers, Sept. 1855. Nos. **4565**, **4568**.

Island of St. Thomas.—Leaves 9-10-jugate. Name "Marapiaõ." Without flowers or fruit. No. **4563**.

The above five Nos. apparently belong to the species as quoted. The name "Paco ballo," one of the most valuable woods for building

purposes, is used in a collective sense, and appears to belong to two or more species of the genus.

2. **Z. melanacanthum** Planch. ex Oliv. *l.c.*, p. 305.

Golungo Alto.—A small young tree, 4 ft. high ; with foliage, but without either flowers or fruit ; forests of Serra de Alta Queta. No. **4526**. A tree 30 ft. high ; branches erect-spreading ; crown lax ; leaflets membranous ; flowers greenish-yellow ; trunk 12 to 20 in. in diam. at the base. In the elevated forests of Sobato de Bumba ; fl. Feb. 1856. No. **4562**. A tree, 15 to 25 ft. high ; trunk beset with strong spines, which in old age go off into large tubercles ; flowers whitish-yellowish. In dense very elevated primitive forests near Quilombo, in Sovado de Quilombo Quiacatubia ; male fl. Jan. 1855. Gathered in fr. near Montalagre in Feb. No. **4569**. A very elegant tree, 10 to 15 ft. high ; branches erect-spreading, as well as the trunk (6 in. in diam.), beset with short, straight, very acuminate prickles, which turn red at the apex ; leaves 3-7-jugate, crowded towards the tips of the branches and branchlets ; petiole (narrowly) alate-channelled ; leaflets sub-opposite, softly (and thinly) coriaceous, very glossy above, a little paler and rather glossy beneath, densely pellucid-punctate. Flowers tetramerous, dicœcious (or polygamous ?), paniculate ; common peduncle compressed, divided into two parts ; remoter branches mostly 4 together, bracteolate at the base, of a rose-red colour. Calyx almost flat, 4-parted ; segments scattered with very minute red dots, otherwise green. Petals 4, ovate-oblong, alternate with the calyx-segments, inserted at the external base of the tetragonal thick disk, slightly imbricate in æstivation, of a pale sulphur colour, recurved-patent during the time of flowering. Stamens 4, inserted with the petals and alternate with them ; filaments flattened from the base, gradually narrowing upwards, as long as the petals ; anthers elliptical, introrse, 2-celled, pale yellow, longitudinally dehiscing. Ovary rudimentary ?, conical, seated on a gynophore or thick elevated tetragonal (angles remarkably truncate) disk, terminated by a short style. In the very shady primitive forests of Sobato de Mussengue, rather rare ; male fl. beginning of Dec. 1855. No. **4570**. A very elegant tree ; in elevated forests amongst the mountains of the eastern Queta, fr. June 1856. No. **4571**. A tall tree, with remarkably good yellowish wood, petiole gibbous at the base. Name "Páo Pacoballa." Bango, in forests, male flower-buds 11 June 1855. A poor specimen probably referable to this species. No. **4619**.

The next two Nos. appear to differ from this species, but to be near to it ; the specimens are without flowers or fruits :—

Golungo Alto.—A small tree, 10 to 15 ft. high ; trunk, branches and petioles bristling with very acute prickles. At the same time a tree of the same, 80 ft. high and laden with ripe fruits, was seen. In shady situations, near Ponte de Luis Somoēs, at the base of the mountains of Serra de Alta Queta, July 1855. No. **4566**. An elegant tree, 12 to 15 ft. high ; branches erect-spreading, as well as the petioles rigidly prickly ; leaves pellucid-punctate. In dense forests, at the banks of the river Delâmboa, Dec. 1855. No. **4567**.

3. **Z. nitens** Hiern, sp. n.

A small tree ; branches rather erect, glabrate or nearly so, densely aculeate with straight or slightly recurving acute prickles, which range up to $\frac{2}{3}$ in. in length ; leaves alternate, exstipulate, impari-pinnate, 4 5-jugate, glabrous, 6 to 11 in. long ; petiole $1\frac{1}{4}$ to 3 in. long, as well as its continuation between the pairs of

leaflets aculeate with recurved prickles; lateral petiolules short; leaflets elliptical, narrowly acuminate at the apex, more or less narrowed at the base, thinly coriaceous, very glossy, delicately veined, dark green above, paler beneath, $1\frac{1}{2}$ to $3\frac{3}{4}$ in. long by $\frac{7}{8}$ to $1\frac{7}{8}$ in. broad, pellucid-punctate, entire or obsoletely crenulate on the margin. Male inflorescence pyramidal, terminal, exceeding the leaves, nearly a foot long, with alternate spike-like ascending branches, nearly glabrous; ultimate pedicels short, not or scarcely equalling the flowers; lower primary branches of the inflorescence 3 in. long, the upper ones gradually shorter; flowers numerous, crowded; calyx small, irregularly 4-cleft; petals 4, often marked with impressed dots, $\frac{1}{10}$ in. long, alternate with the calyx-lobes, reddish or whitish-reddish, arching-reflexed in the open flower; stamens 4, exserted, $\frac{1}{6}$ in. long, alternate with the petals; ovary rudimentary, on a quadrangular disk.

Golungo Alto.—In wooded situations, in Sobato de Bumba and Bango; by the road leading to Bango, with male flowers, in the middle of Dec. 1855. No. **4558**.

The following Nos., all (so far as localised) from the district of Golungo Alto, belong to the same species, or are nearly related to it:—

A small tree; leaves densely pellucid-punctate; fruit (not yet quite ripe) green; infructescence shorter than the leaves, 4 to $4\frac{1}{2}$ in. long; fruit shortly stipitate, marked with impressed dots; in forests amongst the mountains of Capopa, April 1856. No. **4559**. A small tree, 20 ft. high, with elongated branches leafy at the apex, and white flowers; Zenzas de Queta, with shortly stipitate dotted fruits, June 1856. No. **4574**. With male tetramerous flowers. No notes with this number. No. **4575**.

4. **Z. rubescens** Planch. in Hook. Niger Fl. p. 270 (1849); Oliv., *l.c.*, p. 305.

Golungo Alto.—A small tree, 10 to 12 ft. high, with the habit of the Mountain Ash; branches thin, elongate-virgate, variously bent, patent, prickly, with strong spines; leaflets pellucid-punctate; flowers corymbose, white; fruits of a brilliant vermilion colour; seeds black, shining. In the dense more elevated forests of the mountains of Serra de Alto Queta, Zengas do Queta, fr. end of March 1856. No. **4572**. Coll. Carp. 303. A small tree, with the habit of an Ash, and with white flowers. In mountainous situations, Serra de Alto Queta. No. **4573**. Branches erect-patent, as well as the branchlets aculeate; petioles sparingly aculeate; leaflets above dark green, rather glossy, below pale green, very delicately white-lepidote, sparingly supplied with transparent dots, crenate on the margin and bearing a transparent glandular dot in the hollow of each crenature; flowers dicœcious, white, a little fragrant; calyx small, almost flat, deeply 5- (or rather 4-) toothed, with erect-patent teeth whitish-membranous on the margin; petals 4, ovate-oblong, white, many times longer than the calyx, broad at the base, alternate with the calyx-teeth, hypogynous; stamens rudimentary, 4, gland-like, opposite to the calyx-teeth, 2 of them more developed than the rest, ovaries 2, obovate, combined at the base, free at the apex, 1-celled, 2-ovuled; style of each ovary 1, combined at the apex with the style of the other ovary in a capitate-peltate flattish

sufficiently large stigma. At the skirts of the more elevated forests of the mountains of Serra de Alto Queta, near Quilengue, Zenzas de Queta, in female fl. middle of Dec. 1855. No. **4560**.

5. **Z. citriodorum** Welw. ms. in Herb.

An erect glabrous shrub, with numerous stems and branches; twigs and petioles aculeate; prickles of the twigs nearly straight or a little curved. Leaves crowded near the ends of the twigs, alternate, impari-pinnate, 3-4-jugate, 3 to $4\frac{1}{2}$ in. long; petiole rather short; leaflets ovate, rather obtusely pointed or acuminate at the apex, rounded at the base, pellucid-punctate, glossy and deep-green above, greenish-pallid beneath, more or less crenulate on the margin, the lateral ones opposite, subsessile, $\frac{1}{2}$ to 2 in. long by $\frac{1}{3}$ to $1\frac{1}{12}$ in. broad, the upper pairs the larger. Infructescence sub-terminal, spiciform-paniculate, 2 to 3 in. long, erect or nearly so; capsules on short or very short pedicels, pea-shaped, $\frac{1}{6}$ to $\frac{1}{4}$ in. long, seated at the apex of a very short gynophore, red, strongly smelling of lemon-peel; calyx inferior, with 4 rather obtuse segments; pericarp dotted; seed black, shining, sub-globose; hilum circular. The ovate-oblong petals, $\frac{1}{8}$ in. long, in some cases persist at the base of the fruit.

Huilla.—In the elevated thickets of Morro de Lopollo; fr. March 1860. No. **4561**. A shrub 5 to 6 ft. high with very aromatic seeds. Coll. Carp. 304.

The leaves not uncommonly are infested with a species of fungus. Welwitsch found an infusion of the immature capsules highly tonic and strengthening, and the drink had excellent effects on hysterical women, both native and European.

6. **Z. Welwitschii** Hiern, sp. n.

An elegant tree, 15 to 20 ft. high; branches spreading, slender, flexuous, with green lenticellate bark, glabrous up to the inflorescence, unarmed. Leaves alternate or opposite, exstipulate, digitately trifoliolate or occasionally bifoliolate or simple, glabrous; leaflets elliptical or somewhat oblong, narrowed or acuminate at both ends or rounded or emarginate at the apex, glossy, pellucid-punctate, 2 to 8 in. long by 1 to $3\frac{1}{2}$ in. broad, thinly and rigidly coriaceous; petiole $\frac{2}{3}$ to $2\frac{1}{2}$ in. long; petiolule $\frac{1}{16}$ to $\frac{1}{4}$ in. long. Inflorescence axillary and terminal, $\frac{1}{2}$ to $3\frac{1}{2}$ in. long, nearly simple or alternately branched, puberulous; flowers sessile or subsessile, in little clusters arranged in a spicate manner, tetramerous, polygamous?, white or yellowish; calyx small; petals $\frac{1}{10}$ in. long, valvate in æstivation, ovate-oblong; stamens 4, glabrous, $\frac{1}{6}$ in. long; filaments compressed, tapering upwards; anthers short, 2-celled; disk inconspicuous (in the male flowers). Fruit-carpels solitary, glabrous, unequally ovoid, rather more than $\frac{1}{4}$ in. long and rather less in breadth, 1-celled; seed solitary.

Golungo Alto.—In the more elevated primitive forests of Serra de Alto Queta, the flower-buds remaining in the same state from April to Oct.; fl. end of Oct. 1855; rather rare. No. **4554**. Fr. March 1855, sporadic. No. **4555**. At the borders of the forests of Serra de Alto Queta, sporadic, seen always in flower-bud from March to the end of August; April 1855 in flower and in flower-bud. No. **4556**.

3. **CRANZIA** Schreb. Gen. i. p. 143 (March 1789); non Gmel. (1791). *Toddalia* Juss. (July 1789); Benth. & Hook. f. Gen. Pl. i. p. 300.

1. **C. angolensis** Hiern, sp. n.

A small or moderate-sized tree; trunk sometimes attaining 1 to $1\frac{1}{2}$ ft. in diam., soon dividing into spreading branches; branchlets terete or somewhat angular, glabrate or puberulous. Leaves exstipulate, alternate, trifoliate, 3 to 12 in. long; petiole $\frac{3}{4}$ to 3 in. long, more or less puberulous with short hairs; lateral petiolules opposite, $\frac{1}{12}$ to $\frac{1}{3}$ in. long, puberulous; terminal petiolule $\frac{1}{8}$ to $\frac{2}{3}$ in. long, somewhat puberulous; leaflets oval or elliptical, subacuminate or sometimes obtuse at the apex, more or less narrowed or wedge-shaped at the base, thinly coriaceous, glabrous except the puberulous midrib, somewhat glaucous or obscurely green, glossy and inconspicuously veined above, delicately net-veined beneath, $1\frac{1}{2}$ to 7 in. long, $\frac{1}{2}$ to $2\frac{3}{4}$ in. broad. Inflorescence terminal or in the upper axils, pyramidal, 5 to 6 in. long, clothed with very short hairs mixed with rather longer ones; branches alternate; ultimate pedicels about equalling the flowers in length. Flowers white, sweet-scented, rather fleshy, about $\frac{1}{8}$ to $\frac{1}{6}$ in. long; calyx small, not accrescent, green, with 4 or occasionally 5 shortly deltoid and abruptly acute segments, appressed to the petals in the bud but afterwards spreading; petals 4 (or rarely 5), ovate or ovate-lanceolate, white, rather fleshy, resinous-punctate, valvate in æstivation, recurved-spreading in full flower, hypogynous, inserted together with the stamens at the external base of the gynophore, alternate with the calyx-segments, $\frac{1}{8}$ in. long; stamens 4 (or rarely 5 or 6), alternating with the petals, exserted, glabrous, with filaments tapering from a flattened base, and cordiform yellow-white 2-celled (cells diverging) introrse longitudinally dehiscing anthers attached at the middle to the apex of the filament; gynophore short, circular, glandular, surrounded at the basal margin with rather rigid persistent hairs; ovary didymous (or very rarely tridymous or tricoccous, as in Euphorbiaceæ), seated on the gynophore, rather compressed; style thick, very short (or styles 2, nearly distinct at the base and combined at the apex); stigma peltate, with 2 spreading rounded or oblong obtuse thick lobes; ovary after flowering 2-celled, cells 1-ovuled; ovule pendulous. Fruit obliquely ellipsoidal, glabrous, $\frac{1}{3}$ to $\frac{1}{2}$ in. long, somewhat fleshy, dotted, 2-celled, 1- (or 2-) seeded. Seed pendulous, solitary, obliquely ellipsoidal, similar in form to the containing fruit-cell, exalbuminous; embryo with unequal cotyledons.

Golungo Alto.—At the borders of primitive forests, in Sobato de Bumba, along the banks of the rivulet Quiapoza; very scarce; fr. April 1854, fl. Nov. 1855. No. **4552**. Fl. 11 Dec 1854; the leaflets bore a very glossy species of lichen. No. **4553**.

4. **GLYCOSMIS** Correa de Serra; Benth. & Hook. f. Gen. Pl. i. 303.

1. **G. Welwitschii** Hiern, sp. n.

A small bushy tree, with the habit of a Bay-laurel (*Laurus*

nobilis L.), 8 to 12 ft. high; branches erect-patent, glabrous, copiously leafy; leaves evergreen, coriaceous, very rigid, quite dry even in the living state, glossy, glandular-dotted, alternate, exstipulate, unifoliolate, glabrous, rather pallid; petiole $\frac{1}{4}$ to 1 in. long, jointed at both ends, marked with two quasi-decurrent lines; leaflet elliptical or somewhat oblong or obovate, mostly narrowed at both ends, entire, 2 to $7\frac{1}{2}$ in. long by $\frac{3}{4}$ to 2 in. broad, with numerous not conspicuous veins and net-veins and narrowly revolute margin. Infructescence axillary and lateral, racemose, about 1 in. long, 4-8-fruited, glabrous; pedicels shorter than the fruit. Fruit (immature) obovoid, glabrous, $\frac{1}{4}$ to $\frac{1}{3}$ in. long, black, baccate or drupaceous, but little juicy, 2-celled; cells unequal, the larger one containing a small imperfect seed and collaterally a perfect seed occupying the chief portion of the cell with a long attachment to the upper part of the dissepiment, the smaller cell containing 1 or 2 small imperfect seeds; embryo half the length of the perfect seed; cotyledons equal; radicle very short. Fruiting calyx small, inferior, $\frac{1}{12}$ in. diam., with 4? rounded or apiculate segments, saucer-shaped.

Zenza do Golungo.—On dry bushy rocky hills between Camutanda and Quicanda, in young fr. Sept. 1857; also in mountainous rocky situations above Tandambondo, in young fr. Sept. 1854. No. **471**.

This should be compared with *G. africana* Hook. f., which however has rather shorter infructescence and petioles.

5. **CLAUSENA** Burm.; Benth. & Hook. f. Gen. Pl. i. p. 304.

1. **C. anisata** Oliv. in Journ. Linn. Soc. v., Suppl. p. 34 (1861), Fl. Trop. Afr. i. p. 308, non Hook. f.

Var. **multijuga** (Welw. ms. in Herb.).

A shrub or almost a small elegant tree, 7 to 12 ft. high; branches far-reaching, almost sarmentose, slender; branchlets clothed with a very short closely set puberulence, leafy. Leaves pinnate, alternate or sub-opposite, crowded at the extremities of the branches, exstipulate, 3 to 10 in. long; petiole $\frac{1}{2}$ to 1 in. long; petiolules mostly very short; leaflets alternate or sub-opposite, 17 to 32, obliquely ovate or lanceolate, often acuminate at the apex, unequally narrowed at the base, pellucid-punctate with impressed glands, fragrant when rubbed, emitting a very agreeable aroma like that of oranges and lemons, glabrate or puberulous on the midrib and margin, membranous, pale green on both surfaces, entire or minutely crenulate, $\frac{1}{2}$ to 2 in. long by $\frac{1}{6}$ to $\frac{5}{8}$ in. broad. Inflorescence in the upper axils and subterminal, 4 to 9 in. long, puberulous, narrow, paniculate, many-flowered, erect or ascending; ultimate pedicels short. Flowers hermaphrodite, white; buds globose-clavate, 4-gibbous, $\frac{1}{8}$ in. in diam.; calyx small, puberulous, 4-cleft; lobes ovate; petals 4, densely beset with little protuberant green-yellowish glands; stamens 8, 4 opposite the calyx-lobes and 4 opposite the petals; stigma 4-lobed. Young fruit baccate, flask-shaped, dotted with impressed glands, which emit an aroma like

that of the leaflets, ellipsoidal, $\frac{1}{6}$ in. in diam., 1-celled, 1-seeded; seed pendulous.

Golungo Alto.—In the elevated primitive forests of Quilombo Quiacatubia and about the spring of Capopa, fl. Nov. 1855; in the densest forests, about 2,200 ft. of altitude, in Sovado de Quilombo, not uncommon; in young fr. Jan. 1855. No. **1320**.

Pungo Andongo.—In elevated bushy rocky stations, Pedra Cazella, fl. April 1857. No. **1321**.

2. **C. impunctata** Welw. ms. in Herb.

A slender shrub, 7 to 9 ft. high; branches twisted and bent in various directions as if climbing, glabrous, lenticellate, armed at the base of the spreading unarmed branchlets with two recurved red spines. Leaves alternate, exstipulate, impari-pinnate, 2-4-jugate, 3 to 6 in. long; petiole $\frac{3}{4}$ to 1 in. long, short puberulous; petiolules mostly very short; terminal leaflet usually lobed-toothed, $1\frac{1}{4}$ to 2 in. long, membranous; lateral leaflets usually opposite, ovate, $\frac{2}{3}$ to $1\frac{2}{3}$ in. long by $\frac{1}{3}$ to $\frac{3}{4}$ in. wide, more or less narrowed at both ends, glabrous except the narrow shortly puberulous or glabrate midrib and principal veins, membranous, green on both sides, rather paler beneath, not pellucid-punctate, nearly entire or somewhat crenate-dentate along the margin of the upper part. Infructescence in the upper axils and terminal, in lax cymes, shorter than the leaves, $1\frac{1}{2}$ to 2 in. long, shortly puberulous; pedicels slender, ranging up to $\frac{2}{3}$ in. long. Immature fruits drupaceous, green, subglobose, $\frac{1}{6}$ to $\frac{1}{5}$ in. in diam., superior, based by the remains of an apparently small calyx, divided into cells; young seeds pendulous.

Cazengo.—In thickets at the rivulet Luce, not far from its confluence with the river Luinha, rather rare; in young fr. end of Dec. 1854. No. **1317**.

3. **C. melioides** Hiern, sp. n.

A small or moderate-sized dicœcious tree, with the habit of a *Melia* or *Ekebergia*; branches spreading, long, curved; branchlets unarmed, dark green, lenticellate, glabrate except the puberulous copiously leafy extremities. Leaves opposite, exstipulate, deciduous, impari-pinnate, 3-5-jugate, 3 to 12 in. long; petiole $\frac{3}{4}$ to $2\frac{1}{2}$ in. long, glabrate or slightly puberulous, rather slender; lateral petiolules mostly opposite, very short, glabrate or nearly so; lateral leaflets ovate or ovate-oblong, narrowly acuminate at the apex, oblique at the base, glabrous or nearly so, membranous, dark green above, paler green beneath, obscurely pellucid-punctate, with slender venation, ranging up to 4 in. long by $1\frac{1}{2}$ in. broad, margin entire or nearly so, scattered with glands; terminal leaflet ovate or obovate, equally wedge-shaped at the base, about as large as the next lateral leaflets; terminal petiolule ranging up to $\frac{1}{3}$ in. long. Flowers numerous, $\frac{1}{6}$ to $\frac{1}{4}$ in. long, of a pale-sulphur colour, arranged in panicles 2 to 4 in. long which spring with the young leaves from the divisions of the branchlets close to the extremities; calyx very small, deeply 4-cleft, shortly pubescent, with unequal triangular or broadly ovate ultimately spreading segments;

pedicels ranging up to $\frac{3}{8}$ in. long; petals 4 (in the female flowers occasionally 5 or very rarely 6), oblong or oval-oblong, obtuse, concave, imbricate in æstivation, quickly deciduous, rather erect in the male flower but patent in the female flower. In the male flower stamens 8 (or 7), equal, glabrous, $\frac{1}{6}$ in. long, free; filaments flattened, somewhat tapering towards the apex; anthers cordate-oblong, not apiculate, 2-celled, of a deep yellow colour, longitudinally dehiscing; ovary rudimentary, glabrous, prominent. In the female flowers stamens wholly wanting; ovary subsessile, glabrous, surrounded at the base by the adnate annular sufficiently high disk, sub-spherical, obtusely 4-5-angled, dotted all over, 4-5-celled; ovules pendulous, solitary? in each cell; style central, thick, short, surrounded by a rounded papillose-viscid obtusely 4-5-angled stigma. Fruit baccate, green, glandular-punctate, resinous, glabrous, depresso-globose, but somewhat 2-5-furrowed longitudinally, $\frac{1}{4}$ to $\frac{1}{3}$ in. in diam., marked with numerous impressed dots, with 2 or more cells; pedicels ranging up to $\frac{2}{3}$ in. long.

Golungo Alto.—In thickets in hilly situations, at the right bank of the river Cuango, near the road leading to Ambaca, rather rare, with male flowers 31 Oct. 1855. No. **1315**. In the same locality, 300 paces from the trees with male flowers, with female flowers April 1854 and with immature fruit Oct. 1855. Nos. **1315***b*, **1316**.

The dicœcious character of this species is exceptional, not only in the genus, but also in the tribe Aurantieæ, in which it is placed.

Citron, *Citrus medica* L.; var. *acida* (Roxb.). Golungo Alto.—Established, perhaps formerly introduced and cultivated, or possibly wild; in secondary thickets, at the entrance to Mata de Quisuculo in Sobato de Bango; fl. Sept. 1855 and April 1856. Nos. **1319**, **1319***b*.

Orange, *C. Aurantium* L. Golungo Alto.—Frequently cultivated throughout the district; near Undelle, fl. Feb. 1855. No. **1318**. A specimen, without flowers or fruits, from the Island of St. Thomas, where the plant is called "Laranja Mucamba," may be mentioned here. No. **6762**.

XXXI. SIMARUBEÆ.

1. **HANNOA** Planch.; Benth. & Hook. f. Gen. Pl. i. p. 308.

1. **H. undulata** Planch. in Hook. Lond. Journ. Bot. v. p. 567 (1846); Oliv. Fl. Trop. Afr. i. p. 309.

Simaba? undulata Guill. & Perr. Fl. Senegamb. p. 136, t. 34 (1832).

Golungo Alto.—A glabrous evergreen tree, 12 to 30 ft. high, with widely dilated leafy crown and spreading branches, or in young trees 6 ft. high with few short erect-patent branches; leaves impari-pinnate; common petiole deeply channelled towards the base; leaflets in 2 to 14 pairs (besides the terminal one), opposite (or occasionally alternate), coriaceous and hard or on the radical shoots from the stumps of old trees chartaceous, deep green and somewhat glaucous-shining above, beneath much paler and glaucescent, in the dry state turning ferruginous, elliptic-obovate or obcordate, 2 to 4 in. long or on the radical shoots more oblong cuspidate and larger; petiolules (except the terminal ones) not exceeding $\frac{1}{2}$ in., at length usually turned towards one side of

the rachis; midrib prominent beneath, lateral veins nearly parallel, sub-horizontal, not prominent; panicles terminal or axillary, shorter than or exceeding the leaves, ½ to 1½ ft. long; common peduncle compressed, 2-edged; flowers whitish or pale-yellowish, scarcely scented, cymulose-fasciculate; buds white; calyx globose, at first closed, afterwards irregularly bursting into 4 or 5 rather deep segments which cohere in pairs to a great part of their height; petals 5, imbricate, ovate-lanceolate, yellowish outside, sessile, inserted around the cup-shaped disk; stamens 10, exserted, inserted with the petals and alternate with them; filaments mounted on the back of a flattened elongated scale bearded at the apex; ovary sunk in a fleshy pentagonal cup, pentagonal with obtuse very salient angles; style rather thick, crowned with 3 very small red stigmas. (In another flower, 3 sterile carpels appeared to exist within the fleshy cup.) The fruit is enjoyed by green parrots. In the damp rather elevated primitive forests of Serra de Alto Queta, sporadic; fl. middle of May 1855, fr. July 1855. No. **1707**. A branch with foliage of a young tree, in the same locality; 26 Sept. 1855 and July 1856. No. **1707***b*.

The following specimen of a small tree should be compared with *Hannoa undulata* Pl., and apparently belongs to that species; it is without flower or fruit; the leaves are glabrous, alternate, 24 to 31 in. long, petiole 4½ to 7 in., leaflets 14 to 19, the lateral ones, opposite, 3 to 7½ in. long, the older ones ferruginous beneath:—

Golungo Alto.—Queta, July 1855. No. **4541.**

2. **BRUCEA** Mill.; Benth. & Hook. f. Gen. Pl. i. p. 311.

1. **B. antidysenterica** J. F. Miller, Ic. Animal. et Plant. t. 25 (1779); Oliv. Fl. Trop. Afr. i. p. 309.

B. ferruginea L'Hérit. Stirp. Nov. Ic. p. 19, t. 10 (1784-85).

Pungo Andongo.—A shrub of 4 ft. (or perhaps the up-growth from the stump of a mutilated tree); unripe drupes green, 1-seeded; sporadic, in secondary thickets within the lines of the fortifications, near Catete, Jan. 1857. No. **1246.**

3. **AGIALID** Adans. Fam. Pl. ii. p. 508 (1763). *Balanites* Delile; Benth. & Hook. f. Gen. Pl. i. p. 314.

1. **A. ægyptiaca** O. Kuntze Rev. Gen. Pl. i. p. 103 (*Agialida*).

Balanites ægyptiaca Delile Fl. Egypt. pp. 61, 221, t. 28, f. 1 (1812); Oliv. Fl. Trop. Afr. i. p. 315.

Var. β. **angolensis** (Welw. Apont. p. 585, n. 22; Oliv., *l.c.*).

Balanites (sp.), Welw. Apont. p. 560, under n. 141.

Ambriz.—Occasionally in hilly places between Ambriz and Quisembo, sparingly in flower Nov. 1853. No. **1705***b*.

Barra do Bengo, Loanda, and Icolo e Bengo.—A much-branched shrub or small tree, 4 to 12 ft. high, very spiny in poor ground but in damp and rich soil sparingly spiny; trunk straight; leaves grey-green, coriaceous; flowers greenish; fruit of the size and shape of a moderate hazel-nut and of a bright orange-colour, not eaten by the negroes; endocarp thin, crustaceous. Frequent in dry hilly places, flowering and fruiting nearly the whole year, usually in company with Capparideæ, around Loanda, Cacuaco, etc., to Prata. No. **1705**. Coll. Carp. 305 and 320.

Mossamedes.—A small tree, 6 to 10 ft. high, with quite the habit of some Olacineæ ; trunk erect ; crown intricately much-branched ; flowers greenish ; fruit scarlet, size of an acorn. A small-leaved form. Frequent on wooded slopes along the river Maiombo about Pomangâla, elsewhere rarer or almost absent ; always in company with Capparideæ ; fl. end of Oct. 1859. No. **1706**.

In Angola the variety inhabits exclusively the littoral regions (Welw. Apont. p. 560, under n. 141).

XXXII. OCHNACEÆ.

This Family, although not numerous, is remarkable for the elegance of its habit, the peculiar lustre of its foliage and the brilliancy of its flowers and fruits, as well as by the large number of some of its species, which in certain hilly districts, in conjunction with species of *Dichapetalum*, Rubiaceæ, and Filices, constitute the underwood of the forests. See Welwitsch, Apont. p. 565, n. 157.

1. **OCHNA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 317.

1. **O. membranacea** Oliv. Fl. Trop. Afr. i. p. 316.

Golungo Alto.—A shrub, 3 to 5 ft. high ; branches divaricate, often horizontal or pendulous, slender ; leaves not always evergreen, 3 to 4 by 1 to 2 in. ; petioles about $\frac{1}{8}$ in. long ; stipules filamentous, long, caducous ; flowers paniculate, terminal and axillary ; panicles gracefully nodding ; calyx 5-sepalous, imbricate, the 3 outer segments herbaceous, the inner ones sub-corolline, reflexed about the time of flowering ; petals 5, yellow, obovate-spathulate, not unguiculate, equal, inserted on the rather fleshy torus, imbricate in æstivation, spreading-reflexed at the time of flowering ; stamens more than 20, inserted on the torus above the petals, biseriate, all equal and fertile ; filaments more or less cylindrical, free, dilated at the apex into a little receptacle, inserted on which is found the cylindrical-compressed erect 2-celled anther as long as the filament and dehiscing at the apex by 2 round pores ; carpels 5 or 6, whitish and almost hyaline at the apex ; style hyaline, rather compressed, exceeding the stamens, at the apex incurved and crowned with a green peltate-capitate obscurely-lobed stigma. In very shady places, near waterfalls, among the mountains of Alto Queta, in flower-bud in August ; fl. Oct. 1855. No. **4596**. Waterfall, river Cuanza ; in flower-bud August 1855. No. **6704**. In the shade of primitive forests, end of July 1855. No. **6704***b*. (The last two doubtfully determined.)

Var. **rubescens**.

An erect shrub, 4 to 6 ft. high ; leaves $3\frac{1}{2}$ to 7 by 1 to $2\frac{1}{2}$ in. ; petioles about $\frac{1}{8}$ in. or occasionally as much as $\frac{2}{3}$ in. long ; stipules $\frac{1}{2}$ to $\frac{2}{3}$ in. long, compressed-filamentous, deciduous ; flowers orange-red ; calyx enlarged after flowering, spreading, deep blood-red, $1\frac{1}{4}$ to $1\frac{1}{2}$ in. diam. ; stamens indefinite ; filaments filiform ; disk ample, depresso-hemispherical, spongy-turgid, greenish-purple ; fruit-carpels 5 to 3, rather large, nearly $\frac{1}{2}$ in. in the longest diam., reniform, black, smooth, transversely set in the sinuses, which are spotted with white ; putamen crustaceous, 1-seeded ; seeds reniform, nearly $\frac{1}{2}$ in. in diam., umbilicate in the sinus ; testa thin, marked outside with crowded dark nerves which run from the umbilicus toward the back.

Golungo Alto.—Not uncommon, in rather dense woods of Sobato de Bumba and Serra de Alto Queta, at Capopa; with ripe fruit at the beginning of June 1856. No. **4601**. Coll. Carp. 306.

The following is very doubtful; it apparently belongs to this Order, and is perhaps best mentioned under this species:—

Cazengo.—At Muxaula, in fruit. No. **4698**.

2. **O. pulchra** Hook. Ic. Pl. t. 588 (1843) (*pulchrum*); Oliv. Fl. Trop. Afr. i. p. 317.

Huilla.—A small glabrous tree, 5 to 8 ft. high, with divaricate branches and irregular ashy bark; leaves obovate-oval, rounded and subapiculate or retuse at the apex, wedge-shaped at the shortly petiolate base, firmly coriaceous, subentire or spinulose-serrulate, smooth, 2 to $3\frac{1}{2}$ by $\frac{3}{4}$ to $1\frac{1}{3}$ in.; petiole $\frac{1}{8}$ to $\frac{1}{4}$ in. long; stipules narrowly linear, $\frac{1}{4}$ to $\frac{1}{2}$ in. long, deciduous; racemes many-flowered, $1\frac{1}{4}$ to $2\frac{1}{2}$ in. long, terminating the lateral branches; pedicels $\frac{3}{4}$ to 1 in. long, articulated at the base; flowers depresso-globose, $\frac{1}{2}$ to $\frac{3}{4}$ in. diam. after the fall of the petals; sepals rounded, concave, $\frac{1}{2}$ in. long; anthers oblong, rather shorter than the filaments, dehiscing by apical pores; carpels 7; style cleft from the apex. In woods of Proteaceæ, near Mumpulla, rather rare and sporadic; in late fl. or young fr. Oct. 1859. No. **4598**.

3. **O. Afzelii** Br. ex Oliv. Fl. Trop. Afr. i. p. 319.

O. Welwitschii Rolfe in Henr. Bol. Soc. Brot. xi. p. 84 (1893) *ex parte*.

Pungo Andongo.—Without notes. In young fruit. No. **4597**.

4. **O. Welwitschii** Rolfe in Henr. Bol. Soc. Brot. xi. p. 84 (1893) *ex parte*.

Golungo Alto.—A glabrous tree, 10 to 15 ft. high, with trunk 3 to 5 in. diam. at the base and patent branches; leaves deciduous, not fully developed at the time of the opening of the flowers, obovate-oblong, obtusely narrowed or slightly and obtusely acuminate at the apex, somewhat wedge-shaped at the base, crenate-serrulate with teeth tipped by a small apiculus directed upwards and towards the adjacent sinus, shortly petiolate, thinly coriaceous in the adult state, 3 to 6 by $1\frac{1}{5}$ to $1\frac{4}{5}$ in.; venation delicately marked on both surfaces, meandering; stipules small, ovate, caducous; flowers greenish, fascicled at the extremities of short lateral shoots; pedicels 3 to 8 together, $\frac{1}{2}$ to $\frac{7}{8}$ in. long; sepals oval, obtuse, $\frac{1}{4}$ in. long in flower, enlarged in fruit; petals caducous (not seen); stamens numerous; anthers oblong, dehiscing by lateral slits; carpels 7 to 10; style undivided. At the margins of woods, among the mountains of the Eastern Queta, fl. and young fr. Feb. and March 1855. No. **4594**. At Quilombo-Quiacatubia, without flowers or fruits, middle of July 1856. No. **4595**.

The affinity of this species appears to be with *O. leptoclada* Oliv. Fl. Trop. Afr. i. p. 318.

5. **O. gracilipes** Hiern, sp. n.

A small glabrous shrub, 4 in. high; branches divaricate, covered with uneven bark; leaves oblanceolate, obtuse at the apex, wedge-shaped at the subsessile or shortly petiolate base, serrulate, firmly chartaceous, 2 to 3 by $\frac{2}{3}$ to $\frac{3}{4}$ in.; tertiary veins pellucid; stipules cleft, very deciduous; flowers yellow, fascicled a few together on abbreviated axillary or lateral shoots; peduncles slender, $\frac{2}{3}$ to 1 in.

long; sepals oval, $\frac{1}{4}$ in. long; petals obovate, narrowed at the base, not unguiculate, $\frac{1}{3}$ in. long, deciduous; stamens numerous; anthers oblong, dehiscing laterally; carpels about 7; style undivided; stigma subcapitate, somewhat lobed.

Huilla.—In rough stony thickets, at an elevation of 5,000 ft. above the sea, by Lopollo, sparingly; fl. at end of Oct. 1859. No. **4599**.

Nearly related to *O. alboserrata* Engl. Bot. Jahrb. xvii. p. 75 (1893) a white-flowered species from the Zanzibar coast.

6. **O. pygmæa** Hiern, sp. n.

Huilla.—A dwarf glabrous shrub, 2 to 4 in. high, with numerous stems proceeding from a thick woody rhizome; bark uneven; leaves ascending; narrowly oblanceolate, apiculate or emarginate, wedge-shaped to the subsessile base, crenulate-serrulate with apiculate teeth, firmly coriaceous, $1\frac{1}{3}$ to 2 by $\frac{1}{4}$ to $\frac{2}{5}$ in.; stipules lanceolate, about $\frac{1}{8}$ in. long, deciduous; flowers about 2 together, axillary or lateral; peduncles $\frac{1}{6}$ to $\frac{1}{4}$ in. long; sepals oval, about $\frac{1}{5}$ in. long in flower, $\frac{2}{5}$ in. long in fruit, reddish in the dry state; petals orbicular, with a short claw at the base, pale, rather shorter than the sepals; anthers oblong, longer than the short slender filaments, dehiscing laterally? ; carpels 5; style rather long, undivided except the apex, curving; fruit $\frac{1}{3}$ in. long; seeds nearly as long, thick. In shortly bushy pastures between Mumpulla and Humpata, in company with dwarf species of Combretaceæ and Myrtaceæ; fl. and fr. Oct. 1859. No. **4600**.

2. **OURATEA** Aubl. Hist. Pl. Guian. i. p. 397, t. 152 (1775). *Gomphia* Schreb. (1789), Benth. & Hook. f. Gen. Pl. i. p. 318.

1. **O. affinis** Engl. Bot. Jahrb. xvii. p. 79 (1893).

Gomphia affinis Hook. f. in Hook. Niger Fl. p. 274 (1849); Oliv. Fl. Trop. Afr. i. p. 320.

Golungo Alto.—A pretty evergreen shrub, $2\frac{1}{2}$ to 7 ft. high, evergreen, much branched; leaves narrowly elliptical or somewhat obovate, acuminate, apiculate, wedge-shaped at the base, $1\frac{1}{2}$ to 4 by $\frac{2}{5}$ to $1\frac{1}{2}$ in., thinly coriaceous, serrulate-wavy or subentire, glossy, deep-green, with close parallel and minute lateral veins; panicles axillary, lateral or subterminal, about the length of the leaves; flowers yellow or almost orange-coloured; sepals lanceolate, $\frac{1}{4}$ to $\frac{1}{3}$ in. long, at first green, afterwards bright red, persistent; petals oval-oblong, caducous, yellow; anthers sessile, elongate-linear; carpels 5 or 4; drupes red. In dense primitive woods of the mountains of Alto Queta; fl. March 1855, with the fruit fallen in Nov. 1854. No. **4602**. In the more elevated parts of the mountains of Alto Queta; fl. and fr. 28 Feb. 1855. No. **4602***b*. In the woods of the mountains of Alto Queta; in late fl. and fr. March 1855. No. **4603**.

This species is doubtfully distinct from *Gomphia calophylla* Hook. f., *l.c.*

2. **O. reticulata** Engl. Bot. Jahrb. xvii. p. 79 (1893).

Gomphia reticulata P. de Beauv. Fl. d'Ow. ii. p. 22, t. 72 (1807); Oliv. Fl. Trop. Afr. i. p. 320.

Var. ? **andongensis**.

A small tree, 8 to 12 ft. high; trunk scarcely $1\frac{1}{2}$ in. thick, straight, naked, patently branched towards the apex; leaves oval-oblong, obtuse or shortly acute, apiculate or retuse, more or less

wedge-shaped at the base, firmly coriaceous, serrate with shallow acute callous-tipped teeth, shining at least on the upper surface with a metallic lustre, 2 to 7 by $\frac{2}{3}$ to 2 in.; lateral veins arching, not very close nor very conspicuous; petiole $\frac{1}{12}$ to $\frac{1}{3}$ in. long, wrinkled, broad; stipules about equalling the young petiole, with two acutely prolonged points; panicles terminal, rather densely sub-corymbose, 2 to 4 in. diam., shortly pedunculate or subsessile; peduncle $1\frac{1}{2}$ in. or shorter; pedicels $\frac{1}{4}$ to $\frac{1}{2}$ in. long, articulate near the base, usually fascicled or approximated; sepals quincuncial in the bud, $\frac{1}{4}$ to $\frac{1}{3}$ in. long in flower, concave, ovate-oval, obtuse; petals orange-yellow (in the dry state), obovate, dextrorsely convolute in æstivation as seen from above; anthers sessile, thick, narrower upwards, about 7; carpels 5; fruiting sepals revolute, $\frac{2}{3}$ in. long; fruit $\frac{2}{5}$ in. diam.

Pungo Andongo.—Frequent in shady places in Mata de Pungo; fl. and young fr. Jan. 1857. No. **4604**. In fl. and fr. Dec. 1856. No. **4605**.

Var.? **nutans.**

An evergreen shrub, virgately branched; branchlets slender, elongated, nodding; leaves elliptic-oblong, mostly acuminate or acute, rather wedge-shaped at the base, chartaceous, crenulate-serrulate, 4 to 8 by $1\frac{1}{4}$ to 2 in.; lateral veins not very close, patent and arching forwards; petiole about $\frac{1}{8}$ in. long; stipules caducous, extra-axillary, with apparently 2 acute prolonged points; panicles terminal, elongated, nodding, loosely branched, shortly pedunculate; pedicels patent, mostly fascicled 2 to 4 together or approximated, $\frac{1}{3}$ to $\frac{3}{4}$ in. long, articulated about the middle; sepals oval, $\frac{1}{5}$ in. long, in flower, obtuse; petals obovate, nearly $\frac{1}{3}$ in. long; anthers about 8, sessile, thick below, narrowing upwards.

Prince's Island.—In wooded spots of cultivation of Pico de Papagaio, at elevation of 2,000 to 3,000 ft., in company with *Hermannia*, *Gleichenia*, and *Lycopodium cernuum*; fl. Sept. 1853. No. **4606**.

XXXIII. BURSERACEÆ.

1. **BALSAMEA** Gleditsch in Schrift. Berl. Gesellsch. Naturf. Fr. iii. p. 127 (1782).

Commiphora Jacq. Hort. Schœnbr. ii. p. 66, t. 249 (1797); *Balsamodendron* Kunth (1824), Benth. & Hook. f. Gen. Pl. i. p. 323.

1. **B. africana** Baill. Hist. Pl. v. p. 295 (1874).

Heudelotia africana A. Rich. in Guill. & Perr. Fl. Senegamb. p. 150, t. 39 (1832). *Balsamodendron africanum* Arn. in Ann. Nat. Hist. iii. p. 87 (1839); Oliv. Fl. Trop. Afr. i. p. 325. *Commiphora africana* Engl. in DC. Mon. Phan. iv. p. 14 (1883).

Loanda.—A low densely-branched shrub, with decumbent or ascending occasionally hard-spinous branches; leaves trifoliolate; flowers polygamous, from yellow to reddish; drupes glossy-purple, of the size and shape of a pea. On dry hills behind the city of Loanda, from Alto das Cruzes up to Maianga; fr. without fl. Dec. 1858. No. **4497**. A small bush on the bare reddish-sandy hills in Maiongo do Povo; fr. No. **4498**. Leaves larger, ranging up to $4\frac{1}{2}$ in. long. No. **4498***b*. Excursion

to Praia do Bispo; in leaf July 1858. No. **4500.** In flower-bud, without foliage. No. **4501.**

The following two Nos., represented by poor specimens, should be compared with this species:—

Bumbo.—A shrub, 3 to 5 ft., divaricately branched, leafless at the time of gathering. In shrubby situations near Bruco, abundant; in young fr. Oct. 1859. No. **4506.**

Mossamedes.—A low twisted shrub; branchlets patent; drupes reddish, more or less viscid. On stony hills between Quipola and Páo; fr. without leaves Jan. 1860. No. **4504.**

2. **B. longebracteata** Hiern.

Commiphora longebracteata Engl., *l.c.*, p. 19.

Loanda and Icolo e Bengo.—A resinous tree, 10 to 15 ft. high, with a much-branched ample crown; leaves fasciculate at the apex of the branchlets, impari-pinnate, 2-3-jugate or trifoliolate; flowers diœcious, tetramerous; stamens 8. In thickets between Conceicao and Teba, rather rare; male fl. end of Nov. 1858. No. **4494.** A much-branched bush, 8 to 10 ft. high, rarely higher; crown dilated; branches and branchlets flexuous, grey; leaves 1-2-jugate, the terminal leaflet always the largest, all rather rigidly chartaceous, dull green above, bright green beneath with pellucid veinlets; calyx adhering to the base of the drupe, 4-toothed; drupe obovoid-oblong, but little compressed, reddish, glabrous, occasionally bi-sulcate, containing within the resinous-viscid flesh the rather viscid 1-seeded putamen apparently resulting from a 2-3-celled ovary with the cells mostly abortive; immature seed apparently globose, attached near the apex of the cavity or a little below it. On sandy-clayey hills between Quicuxe, Cacuaco and Teba; young fr. August 1858. Native name "Calusangè." No. **4495.** A bush frequently branched from the base; trunk 4 in. diam.; bark smooth, greenish-white, splitting in thin plates like that of *Betula alba*; leafless at the time of flowering. A decoction of the bark is often employed by the negroes as a remedy in the case of flatulent colic. Rather rare in sandy steep situations above the city of Loanda near Alto das Cruzes; in leaf without either fl. or fr. 8 Dec. 1858. Called "Calusange." No. **4496.**

3. **B. angolensis** Hiern.

Commiphora angolensis Engl., *l.c.*, p. 24.

Loanda.—On low hills between Teba and Cacuaco; fl. Dec. 1853. No. **4485.** Fr. No. **4486.** By the road from Quicuje to the Represa Ricardo; fr. 7 Feb. 1859. The "Calusange" tree (a name also used for *B. longebracteata*, and in Zenza do Golungo for *Peucedanum fraxinifolium* Hiern). No. **4488.** This No. is quoted by Engler, *l.c.*, for this species, though it seems scarcely to differ from *C. longebracteata* Engl.

Pungo Andongo.—In fr.; apparently this species. No. **4487.**

Mossamedes.—A shrub, 5 to 6 ft. high. In shrubby situations at the river Maiombo, near Cazimba; without fl. June 1860. Very doubtfully referred to this species. No. **6747.**

4. **B. Welwitschii** Hiern.

Commiphora Welwitschii Engl., *l.c.*, p. 22.

Huilla.—A shrub of 3 to 5 ft. In the shrubby parts of Ferrão da Sola; fr. Jan. 1860. No. **4493.** As tall as a man, patently branched; flowers of a whitish rose colour. In rocky places, Cume de Serra da Xella; fl. Oct. 1859. No. **4492.**

Bumbo.—A shrub of 6 ft., almost a little tree; calyx-lobes 4, acuminate; petals 4, erect, valvate; stamens 8, unequally long, inserted on the disk below its margin; disk urceolate, with a free margin. In bushy places near Bruco; fl. without leaves Oct. 1859. No. **4491.**

5. **B. Mulelame** Hiern, sp. n.

Commiphora (sp.), Ficalho, Pl. Ut. p. 114 (1884).

A dicœcious tree, 12 to 25 ft. high, glabrous in most parts, leafless at the time of flowering; trunk straight; crown dilated; branches divaricately spreading, spinous by some of the branchlets becoming abortive and terminating in hard acute points; epidermis of the bark greenish-white, quite smooth, separating in very thin layers after the fashion of the skin of *Betula alba* L. Inflorescence at or near the apex of short branchlets or lateral, $\frac{1}{2}$ to $1\frac{1}{4}$ in. long, glabrous or very nearly so; peduncles $\frac{1}{4}$ to $\frac{3}{4}$ in. long, branched at the apex; ultimate pedicels very short; bracteoles ovate, small; flower-buds scarlet; flowers tetramerous, $\frac{1}{8}$ in. long; calyx $\frac{1}{20}$ in. long, reddish, shortly cleft, tube somewhat funnel-shaped, lobes deltoid; petals oblong, valvate or nearly so in æstivation; stamens 8, of which 4 are longer than the others and pale greenish-yellow turning reddish and rather fleshy.

Golungo Alto.—On wooded hills, at the skirts of little woods of *Dichrostachys*, along the right bank of the rivulet Chixe; fl. Sept. 1857. Negro name in this district "Mulelame," and in Libongo "Mungolo"?. No. **4489.** Near the stream Chixe, in little woods of *Acacia*, rather rare; with young fl. Sept. 1854. No. **4502.**

The following two Nos. in fruit have the branches of the infructescence clothed with short hairs, and should be compared with this species; the drupes are irregularly oval, about $\frac{1}{3}$ in. long, somewhat compressed, 1-seeded and based by a small 4-cleft hairy calyx:—

Libongo.—A tree, 15 to 20 ft. high, much branched; bark smooth, white-greenish, throwing off the epidermis in plates as does *Betula alba* L.; branches patent, densely ramulose; leaves impari-pinnate (not shown on the specimen), absent in the winter (July and August). Probably dicœcious. Abundant in the drier forests and still more abundant on the dry hills, in company with species of *Aloë*, from Libongo to Bombo; very sparingly in fr. Sept. 1858. Negro name "Mungólo." No. **4499.**

Golungo Alto.—A much-branched bush, 10 ft. high; bark smooth, white-greenish, the epidermis separating in thin plates as in *Betula alba* L.; leaves absent at the time of fruiting; drupes pea-shaped, black-reddish, a little juicy. Perhaps a female plant of the tree Mulelame. In shrubby situations on the right bank of the rivulet Chixe, between Calôlo and Mongolo; fr. beginning of Sept. 1857. No. **4490.**

6. **B. (?) fraxinoides** Hiern, sp. n.

A tree, 30 to 35 ft. high, with the habit of an Ash; branchlets dark-ashy, minutely warted, glabrate, resinous?, pubescent and leafy at the apex; leaves (young) alternate, crowded, exstipulate, pinnate, usually pari-pinnate and 4-jugate, 6 to 8 in. long or more; petioles slender, furrowed, glabrate, 1 to $1\frac{1}{2}$ in. long; leaflets

elliptical-oblong, rather obtusely narrowed at both ends, membranous, somewhat dentate along the upper part, subsessile, 1 to 2½ in. long by ⅓ to 1⅓ in. broad, glabrescent. Infructescence lateral or axillary near the tops of the branches, paniculate, 3 to 4½ in. long, a little hairy in the upper part; calyx 4-fid or unequally 5-fid; lobes small, obtuse, ciliolate; ovary 2-celled; cells 2-ovuled; ovules pendulous from the upper part of the cell, collateral; style rather long, glabrous, bifid at the apex; young fruit ellipsoidal, rather compressed, ⅗ in. long; seed solitary.

GOLUNGO ALTO.—Capopa; in young fr. Feb. 1856. No. **4544.**

7. **B. (?) multijuga** Hiern, sp. n.

A glabrous diœcious shrub, 6 to 8 ft. high, branched from the base; branches spreading, elongated; branchlets patent, short, tapering; resin-canals large; bark fuscous; leaves alternate, more or less crowded at the extremities of the branchlets, impari-pinnate, about 8-10-jugate, 6 to 8 in. long or more; common petiole 1¼ to 1½ in. long, rather slender; petiolules ⅛ to ½ in. long, very slender; leaflets (young) irregularly elliptical, narrowed at both ends, often sinuous or repand, membranous, ½ to 1¼ in. long by ¼ to ⅝ in. broad. Male inflorescence lateral on the branchlets, spreading, ⅜ to ¾ in. long; common peduncle ⅛ to ½ in. long, few-flowered, often clustered a few together; pedicels short; flowers tetramerous, purplish; calyx-lobes shortly deltoid; petals twice as long as the calyx-lobes; stamens 8 (?), unequal, inserted on the margin of the disk which fills the calyx-tube.

MOSSAMEDES.—In mountainous rocky situations between Cazimba and Pomangala, but abundant in only one spot; male fl. June 1860. No. **4503.**

8. **B. (?) foliolosa** Hiern, sp. n.

A hard very rigid erect shrub, 3 to 6 ft. high, resembling in habit a *Schotia*, much branched; branches tortuous; branchlets numerous, patent, short, rough, at length nodulose, leafy. Inner bark supplied with rather few and small intercellular resinous canals. Leaves 1 to 2 in. long, pari- or impari-pinnate, 5-9-jugate, rarely 10-jugate; common petiole short, crowded, clothed with short hairs; leaflets obliquely obovoid, entire or sub-repand, emarginate at the apex, unequal at the base, glabrous or nearly so, overlapping or approximated, ¼ to ½ in. by ⅙ to ⅓ in., rather glossy, very bright green, thinly coriaceous, pinnately venulose, rather rigid. Fruit baccate, rather dry, ovoid, ½ in. long, glabrous, glossy, tipped with the hardened style, greenish-red outside, 1-seeded; seed filling the whole of the cavity, exalbuminous; embryo large, bright green; radicle lateral, turned downwards; cotyledons thick, hemispherical, horizontal.

HUILLA.—In rocky places, along the cataracts of the river of Lopollo and Monino, rather rare; fr. middle of Dec. 1859. No. **4507.**

There is another species of the genus in the collection which is without flower or fruit:—

MOSSAMEDES.—A low twisted shrub, extremely resinous in all parts; stems thick, the stem sometimes swollen at the base into a flask-like

shape ; leaves trifoliolate. By the red-sandy rocks at the base of Serra de Montes Negros, 10 August 1859. No. **1253.**

No. **4505** is a leaf of a bush which grew amongst the rocks at the bottom of the bed of the river Bero, near the copper-mine ; its trunk resembled in form a narrow-necked water-jug. Genus doubtful.

2. **CANARIUM** L. ; Benth. & Hook. f. Gen. Pl. i. p. 324.

1. **C. edule** Hook. f. ex Benth. in Hook. Niger Fl. p. 285 (1849) ; Oliv. Fl. Trop. Afr. i. p. 327 ; Engl. in DC. Mon. Phan. iv. p. 144 (1883).

C. Mubafo Ficalho in Bol. Soc. Geogr. Lisboa, ser. ii. p. 611.

Cazengo.—Tree supplying Gum Elemi ; at Dalatanda ; flower-bud June 1855. No. **4482.** A tree, 30 to 70 ft. high, with grey-whitish bark, abounding with an aromatic resin ; branches spreading, tuberculate ; branchlets furrowed, marked after the fall of the leaves with cruciform scars ; leaves impari-pinnate ; leaflets dryly coriaceous, rigid, glossy-green above, paler beneath ; petioles many-furrowed ; inflorescence paniculate-thyrsoid, ferruginous-lepidote, as are likewise the younger branchlets. In the less dense forests, near Caculo, Dalatanda, etc., sporadic ; in flower-bud and ripe fr. 2 Sept. 1855, fl. middle of Sept. 1855 and beginning of Sept. 1856. Native name "Mubafo" or "N-bafo." No. **4483.** Seeds in August 1855. Coll. Carp. 307. Seed 12 Sept. 1856. Coll. Carp. 308. On the leaflets of Mubafo grow the lichen n. 262 (*Strigula complanata* Mont.).

Pungo Andongo.—Gum Elemi. Coll. Carp. 307*b*.

Gaboon.—Gum Elemi. Coll. Carp. 307*c*.

Island of St. Thomas.—Fruit purplish Dec. 1860 ; fl. August and Sept. Native name "Saffu." No. **4484.** Native name "Safù-safù." Coll. Carp. 309. See Brown in Tuckey, Congo, p. 474 (1818).

This is the species of *Canarium* referred to by Welwitsch, Apont. p. 565 under n. 156, which he states has two large stipules at the base of each leaf ; unless these are to be considered as the lowest pair of leaflets, the plant is exceptional in the Family, the leaves of which are characterised as exstipulate.

The Gum Elemi trickles down in great quantity from incisions made in the trunk, and the natives employ the resin, which possesses a peculiar aromatic smell, in the form of a plaster to cure wounds ; they also frequently bring it to the markets at the coast, where the druggists and other colonists buy it at the price of 100 to 200 milreis per lb., and at times at a much dearer rate, for similar purposes. The fruit is oily, and serves the natives to season various comestibles. The Mubafo occurs in the primitive forests in the districts of Cazengo and Pungo Andongo, and in greater abundance in that of Talamungongo and neighbouring territories. The powdered bark is used by the natives in the treatment of syphilitic and scorbutic ulcers. (See Welwitsch, Synopse, p. 35, n. 94, and p. 56, n. 149.)

There is a poor specimen from the Island of St. Thomas, a woody branch without either flower or fruit, which perhaps belongs to the genus *Canarium* ; the local name is "Páo Oleo." No. **6770.**

3. **SANTIRIOPSIS** Engl. Bot. Jahrb. xi., Beibl. No. 26, p. 6 (1890).

1. **S. balsamifera** Engl., *l.c.*

Santiria ? balsamifera Oliv. in Hook. Ic. t. 1573 (Feb. 1887). Cf. *Sorindeia ? trimera* Oliv. Fl. Trop. Afr. i. p. 441 ; Ficalho, Pl. Ut. p. 277 (1884).

Island of St. Thomas.—A tree, the trunk of which when wounded exudes a balsam. No. **4550.** Dec. 1860. No. **6767.** Monte Caffé. The branches of the tree afford the Balsam of St. Thomas; sent by Sen. Velloso, Dec. 1860. No. **6768.**

The Balsam of St. Thomas is much sought after in the island on account of its reputation for quickly healing wounds and ulcers. The tree is of moderate height, with pinnate and evergreen leaves. During Welwitsch's short stay in the island, he was unable to discover specimens either in flower or fruit. (See Welwitsch, Synopse, p. 48,n. 131.)

4. **ZANHA** Hiern, gen. nov.

Flowers diœcious. Calyx turbinate; limb 4- or very rarely 5-cleft; lobes valvate in the bud. In the male flowers petals 0; stamens 4 (or in the very rare pentamerous calyx 5), exserted, attached at the bottom of the calyx-tube to the internal face of the glandular disk; filaments cylindrical, equally thick throughout their entire length, irregularly and many times curved; anthers shortly ovoid-oblong, basifixed, 2-celled; cells opposite, longitudinally dehiscing; rudiments of the ovary 0. Female flowers and fruit unknown.

An unarmed tree with resinous bark, alternate branches and pinnate leaves.

1. **Z. golungensis** Hiern, sp. n.

A vast tree, 30 to 40 or 50 ft. high; trunk $3\frac{1}{2}$ ft. in diam. at the base; branches patent; branchlets scattered, ascending, densely clothed all over with circular or oblong reddish or brick-coloured verrucose scales, leafless at the time of flowering. Leaves glabrous, 7 to 14 in. long; leaflets 9 to 13, opposite or alternate, oval-oblong, shortly and obtusely acuminate at the apex, unequal at the base, coriaceous, entire, somewhat undulate, rather glossy and of same colour on both surfaces, $1\frac{3}{4}$ to 3 in. long by $\frac{3}{4}$ to $1\frac{1}{4}$ in. broad; petiolule $\frac{1}{8}$ in. Male flowers greenish, arranged in little dense cymes close to the extremities of the branches; peduncles ranging up to 1 in.; calyx green, outside densely scaly-glandular; lobes erect, ovate-acuminate, bearded at the apex with rather crisp hairs; glands of the disk green.

Golungo Alto.—In the primitive forests of Quibôlo, on the left bank of the Quibôlo rivulet; male fl. without leaves middle of August 1856. No. **4545.** Leaves and petioles collected under the tree during a monkey hunt; August 1856. No. **4546.**

The genus is allied to *Ganophyllum* Blume, and seems better placed in Burseraceæ than in Sapindaceæ.

XXXIV. MELIACEÆ.

The Meliaceæ of the Flora of Angola, though not very numerous in species, nevertheless constitute one of the most important Natural Orders, particularly on account of the gigantic size of the trees and the fragrance of the flowers in some genera, and still

more on account of the usefulness of their timber and oily seeds; most of them are distinguished by their majestic habit, so much so that they decidedly influence the physiognomy of portions of many primitive forests. *Turræa* contains two species, one a tree, the other a climbing shrub; the latter envelopes with its green foliage the higher trees on the borders of shady forests. *Nelanaregam*, the smallest of all known Meliaceæ, forming a little shrub scarcely 3 in. high, is covered at the beginning of the rainy season with rather large snake-like long-tubed white flowers, announcing the approach of spring in the southern hemisphere, as do the species of *Anemone* in Europe. Of the Tribe Melieæ, *Melia dubia* Cav. must be regarded as the most prominent; it is found frequently in the higher mountainous districts of Golungo Alto, Pungo Andongo, Dembos, etc.; and its wood, of a pretty cinnamon-colour, of light specific gravity, of great durability, and easily cut, is very much prized even by the natives; in many parts of the hilly regions, for instance, about Cambondo, a station between Trombeta and Sange, in Golungo Alto, it furnishes the materials for a special industry; for many thousands of little chests, used by the negroes, are annually manufactured from the timber of this *Melia*, and the cost, owing to the cheapness of the abundant materials as well as to the low scale of wages, is only about 150 to 200 milreis each, a price which renders them accessible even to the poorest traveller. *Melia Azedarach* L. is cultivated by the colonists rather frequently and in nearly all districts; it is one of the favourite trees of the Portuguese, who call it "Sycomoro," while the natives, perceiving at once its affinity to the above-mentioned indigenous *Melia*, call the introduced *Melia* "Bombólo-ian-Puto," that is, Portuguese *Melia*; for Bombolo is the negro name for *Melia*.

Trichilia is called "Páo cachique" in Golungo Alto; but several trees of different Natural Orders, or, at least, of different genera, are called by the same name. *Trichilia*, which is represented by three species, is particularly remarkable for its fatty seeds, and inhabits the whole breadth of the continent; the seeds are called "Mafureira" and the tree itself "Mafura"; it occurs in Mozambique on the east coast, and is more frequent there than in Angola; in Mozambique tallow is manufactured from it. In the Kalahari region of South Africa, Burchell (*Travels*, vol. ii. p. 594, 1824), states that "mahúra" signifies fat in any form. The wood of the species of *Trichilia* is more or less of a cinnamon colour, the same as that of many other Meliaceæ, but with a much finer grain, firmer and harder than that of *Melia dubia* Cav., taking a very fine polish. *Carapa*, *Entandrophragma*, and *Khaya* belong to the giants of the primitive forests of Angola, and each of them is so distinct, owing to its peculiar habit, that an observer, even at a considerable distance, can easily distinguish them from the other forest trees; the timber of these three genera must be classed among the most useful and highly-prized of those in the African forests.

1. **TURRÆA** L.; Benth. & Hook. f. Gen. Pl. i. p. 331.

1. **T. Vogelii** Hook. f. ex Benth. in Hook. Niger Fl. p. 253 (1849); Oliv. Fl. Trop. Afr. i. p. 330.

Var. β. **scandens** C. DC. in DC. Monogr. Phanerog. i. p. 444 (1878).

Golungo Alto.—A robust shrub, climbing to a considerable height, then very ornamental with elongated-sarmentose pendulous branchlets; flowers white, fragrant; capsule pyriform, spreading in an arching manner, dehiscing stellately; seeds enveloped with a scarlet-red or brick-red aril. Sporadic in the primitive forests among the mountains of Sobato de Quilombo Quiacatubia, at the banks of the river Muio; fl. and nearly ripe fr. end of Nov. and beginning of Dec. 1854 and again in Feb. 1855. No. **1300**. Cf. Coll. Carp. 313.

2. **T. procera** Welw. [ms. in Herb.] C. DC., *l.c.*, p. 444 (1878).

Prince's Island.—A handsome tree, 25 to 30 ft. high; crown ovoid, dilated; branches patent; branchlets virgate, pendulous; flowers white, fragrant; capsule obovoid-hemispherical, at length dehiscing in a stellate manner; seeds coriaceous, adhering to the inner part of the valves. Not uncommon, in the dense woods which adorn the shore in the Bay of S. Antonio; fl. and fr. Sept. 1853, in company with *Dalbergia malifolia* Welw. (Herb. 1886). No. **1299**.

2. **NELANAREGAM** Adans. Fam. Pl. ii. p. 343 (1763). *Naregamia* Wight & Arn. (1834); Benth. & Hook. f. Gen. Pl. i. p. 331.

1. **N. alata** O. Kuntze Rev. Gen. Pl. i. p. 110 (1891) (*Nelanaregum alatum*); *Naregamia alata* Wight & Arn. Prodr. Fl. Penins. Ind. Or. p. 117 (1834).

Var. β. **africana** (Welw. Sert. Angol. p. 21; C. DC. in DC. Monogr. Phanerog. i. p. 447).

Pungo Andongo.—A herb, 2 to 3 in. high, growing in a cæspitose manner, with a many-headed woody rootstock, or a dwarf shrub with the habit almost of a *Turræa*; leaves pinnately trifoliolate; flowers white. Plentiful but only in one place, in thin woods at the margins of forests composed of *Leguminosæ*, at the left bank of the stream Lutete; fl. Oct. 1856. No. **1301**.

Welwitsch sought in vain for specimens in fruit in Jan. and Feb. 1857; according to a manuscript note of Welwitsch the plant occurs also in the district of Ambaca.

3. **MELIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 332.

1. **M. Azedarach** L. Sp. Pl. edit. 1, p. 384 (1753); Oliv. Fl. Trop. Afr. i. p. 332.

Azederach deleteria Moench, Meth. Pl. p. 171 (1794). *Melia florida* Salisb. Prodr. Stirp. Hort. Chapel Allert. p. 317 (1796).

Var. α. **glabrior** C. DC. in DC. Monogr. Phanerog. i. p. 452.

Prince's Island.—A pretty arborescent shrub, called by the Portuguese "Sycômora." Sometimes subspontaneous in bushy places around dwellings, Bay of S. Antonio; fl. and young fr. Sept. 1853. No. **1293**.

Loanda.—Leaflets usually 9 or even 11; petioles at the base, at least at the very base semicylindrical, hollowed on the inner side, channelled, about half amplexicaul; drupes turning a pale yellowish colour.

Occasionally cultivated in gardens at Loanda, having been introduced from Portugal about the year 1849, and sometimes spontaneous, fully enjoying an equinoctial climate; fl. and ripe fr. on the same tree Nov. 1858. No. **1297.**

Golungo Alto.—Flowers of a deep lilac colour. Cultivated in gardens near Sange from seeds sent from Lisbon, in young fl. August 1857. No. **1294.** ? Leaves (perhaps belonging to the next following species) from a cultivated tree, gathered in the garden of Senr. Pereira at the banks of the river Luinha, near the boundary of the district of Cazengo, Dec. 1854. No. **1296.**

Pungo Andongo.—A young plant without fl. or fr. (perhaps belonging to the next following species), the up-growth from the stock of a burnt tree; in thickets within the fortress of Pungo Andongo, Dec. 1856. No. **1295.**

2. **M. dubia** Cav. Diss. (vii.) p. 364 (1789); Hiern in Hook. f. Fl. Brit. Ind. i. p. 545 (1875); C. DC., *l.c.*, p. 453 (1878).

M. Bombolo Welw. Apont. p. 561, under n. 143; Welw. Synopse, p. 12, n. 24; C. DC., *l.c.*, p. 454, n. 4 (*Bambolo*). *M. æthiopica* Welw. Apont. p. 584, n. 5.

Golungo Alto.—A handsome tree, 30 to 50 ft. high or more, with an ample crown; trunk 2 to 3 ft. in. diam.; branches on the lower part of the trunk sparse or none; wood smooth, cinnamon-coloured or turning reddish, durable, tenacious and easily cut, and therefore highly valued by the natives for various domestic utensils; flowers pale sulphur-yellow, sweet-scented; ripe fruits yellowish-green or dark green, cylindric-ellipsoidal, blunt at both ends, 1 to 1½ in. long, nearly ⅔ in. thick in the middle; juice somewhat milky, the bitterest substance found by Welwitsch in any plant of tropical Africa, and when properly prepared would probably prove an efficacious remedy against fever in like manner as quinine bark; kernels of the fruit cylindrical, nearly or quite an inch long, about ¼ in. diam. or more, blunt at both ends. Frequent in the more elevated primitive woods throughout the district; fl. and fr. Sept. and beginning of Oct. 1855 and April 1858. No. **1298** and Coll. Carp. 310. ? Upper and lower leaves of a young tree, 12 ft. high, at Sange in front of Senr. Perreira's cubata, Feb. 1855. No. **1298***b*. A vast tree; leaves pinnate, coriaceous; fruit drupaceous, olive-shaped, black, glossy, paniculate, hanging down from the apex of the branchlets; Sept. 1855. Apparently this plant. Coll. Carp. 353.

Also in the districts of Cazengo, Pungo Andongo, and Malange (Welw. Synopse, *l.c.*). Native name "Bombolo."

In the territory called Cambondo, in the district of Golungo Alto, there are manufactured every year thousands of small chests of this Bombolo wood, which are sold by the negroes in all the interior regions (Welw. Synopse, *l.c.*).

4. **GUAREA** L.; Benth. & Hook. f. Gen. Pl. i. p. 335.

1. **G. africana** Welw. ex C. DC. in DC. Monogr. Phanerog. i. p. 576 (1878).

Golungo Alto.—An immense handsome tree, 30 to 50 ft. high; trunk very strict, 3 to 4½ ft. diam. at the base; bark ashy-reddish; branches patent-ascending, elongated; crown very elegant; leaves especially at the extremities of the branches crowded, very patent, 2 to 2½ ft. long; leaflets about 23, alternate, narrowly oblong, cuspidate, 5 to 7 in. long, 1 to 1½ in. wide, glabrous on both sides; petiolules ⅛ to

$\frac{1}{4}$ in. long; flowers forming ample pyramidal panicles at the extremities of the branchlets, white; those in the axils of the leaves more or less abortive; common peduncle acutely angled; calyx cup-shaped, somewhat 5-toothed, sometimes 6-toothed; petals 5, rarely 6, adhering to the staminal tube and cohering up to their middle, valvate in æstivation; anthers 10, sometimes 12, attached by a third of their back to the staminal tube, the alternate ones higher than the others; staminal tube 5-6-striate, pilose inside. Disk obsolete; ovary 2-3-celled; ovules few, 2? in each cell; stigma peltate-capitate, reaching the level of the anthers. In the primitive woods of Mata de Quisucula, near Bango Aquitamba; in flower-bud end of April 1856. No. **1306.**

5. **EKEBERGIA** Sparrm.; Benth. & Hook. f. Gen. Pl. i. p. 335.

1. **E. senegalensis** A. Juss. Mém. Méliac. p. 82, t. 17, f. 16*a* (1830); Oliv. Fl. Trop. Afr. i. p. 333.

Var. **coriacea** C. DC. in DC. Monogr. Phanerog. i. p. 642 (1878).

Golungo Alto.—A vast tree, 30 to 40 ft. high; trunk at the base 2 to 3 ft. in diam.; branches patent; fruiting branchlets at length nodding-pendulous; leaflets in 4 to 6 pairs and an odd one, coriaceous, rather shining above, pale-glaucous beneath; common peduncle semi-cylindrical, acutely winged; fruiting peduncles axillary near the extremities of the branchlets, bearing a few-fruited raceme, pendulous; fruit fleshy, spherical, green-dusky outside, borne at the base on the remains of the calyx, bluntly umbonate at the apex with the stump of the style, 5-celled, exuding a viscid watery-milky juice which in drying hardens into a gum, covered outside with circular bright scarlet-red crowded rather convex gland-like dots; seeds solitary, elongate-reniform, pendulous from the top of axis; testa hard, whitish-brown. Native name "Ngilicà ià muxito." Sporadic in the primitive woods of Sobato de Quilombo-Quiacatubia, at an elevation of 2,400 ft.; in nearly ripe fr. middle of July 1856. No. **1704.** Berry coriaceous, yellowish, rather fleshy, very resinous, 5-celled, 5-winged, 1-4-seeded; same locality and date. Seeds. Coll. Carp. 312.

The following specimen of the foliage of a low tree with much-branched crown may possibly belong to the same species; the leaflets are narrower and more numerous:—

Golungo Alto.—In wooded places among the mountains of Alto Queta; June 1856. No. **1704***b*.

2. **E. benguelensis** Welw. ex C. DC., *l.c.*, p. 642 (1878).

Huilla.—Flowers white; anthers 10; staminal-tube cylindric-campanulate, hairy within; disk cup-shaped, with a swelled mouth; style thick; stigma capitate, 2-3-lobed. In the drier thickets near Lopollo; in late fl. Oct. 1859. No. **1303.** An erect shrub; fruit turning a pretty red colour. In thickets near Lopollo, in the same spot as the former No., at an elevation of 5,000 ft.; with nearly ripe fr. Dec. 1859. No. **1304.**

3. **E. Welwitschii** Hiern ex C. DC., *l.c.*, pp. 643, 780 (1878).

Pungo Andongo.—An erect shrub, 5 to 6 ft. high, with several stems from the ground; leaflets velvety beneath; male flowers throughout whitish-tomentellous, 5-6-merous; petals longer than the calyx; staminal tube with very short teeth; disk rather tumid at the margin style thick, stigma rather deeply bilobed. In stony thickets at the left bank of the river Lutete; fl. Oct. 1856. No. **1302.**

4. **E. fruticosa** C. DC., *l.c.*, p. 644 (1878).

AMBACA.—A shrub, 4 to 7 ft. high ; stem erect ; habit nearly that of Spondiaceæ ; bark red-warty, marked with decurrent ridges proceeding from the articulated base of the petioles ; leaves odd-pinnate, together with the flowering racemes developed near the extremities of the stems ; leaflets coriaceous, glaucous, paler beneath. Buds white ; fruit fleshy, 3-celled, of a blood-red colour, as also the petioles and midribs of the leaflets. Not rare in bushy stony places near Zamba and in the direction of the river Lutete ; in young fr. Oct. 1856. No. **1305**.

This species may perhaps prove to be a variety of *E. benguelensis* Welw.

6. **TRICHILIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 337.

1. **T. strigulosa** Welw. ex C. DC. in DC. Monogr. Phanerog. i. p. 658 (1878). Cf. *Trichilia* (sp.), Welw. Synopse, p. 7, n. 3.

GOLUNGO ALTO.—A tree, 20 ft. high, with a lax crown and elongated branches. In primitive woods near Undelle, sporadic ; sparingly in fl. April 1856. No. **1311**. In the primitive forests of Sange. Seeds, 1856. COLL. CARP. 315.

The tree referred to by Welwitsch, Synopse, *l.c.*, has a tall trunk, 2 to 3½ ft. diam., and is occasionally met with also in the districts of Cazengo and Dembos. The next two species might have been also intended.

2. **T. vestita** C. DC. in Bull. Herb. Boiss. iv. p. 428 (1896).

GOLUNGO ALTO.—A beautiful tree, 15 to 25 ft. high, with an ample crown; trunk 1 to 1⅔ ft. diam. at the base ; branches spreading ; leaflets in 3 to 4 pairs with or without an odd one, opposite or subposite, more or less acuminate, obovate or obovate-elliptical, 2 to 8 by ⅞ to 3¾ in., dry-coriaceous, obscurely green hardly shining above, pale beneath, midrib thick ; capsule globose, size of a poppy-head, velvety, 3-valved, 3-celled ; cells 2-seeded ; seeds size of a bean, scarlet with a black spot on the convex surface, flat on the other side. In moist woods of Sobato de Bumba, near Quibixe and Cangunhe, sporadic ; with ripe fr. beginning of Oct. 1855. No. **1309**. A tree, 30 ft. high. At Cazengue, near Queta Central ; fl. June 1856. No. **1310**.

3. **T. Welwitschii** C. DC. in DC., *l.c.*, p. 659.

GOLUNGO ALTO.—A magnificent tree, 30 to 40 ft. high or even higher ; trunk 1½ to 2 ft. in diam. at the base ; branches rather patent, irregular ; leaflets coriaceous, pale beneath. In the primitive woods at the base of the mountains of Alto Queta ; at the right bank of the river Luinha, in flower-bud Nov. 1855, sparingly ; fr. June 1856. No. **1312**. A tree, 20 to 25 ft. high or more, with a fine crown and straight trunk a foot in diam. In the more elevated parts of Alto Queta ; in young fr. Dec. 1855. No. **1312***b*. A vast tree, 25 to 35 ft. high, with broad leafy crown ; branches nearly erect ; leaves 2 to 3 ft. long, pinnate, beneath shining with a silvery or coppery lustre ; flowers crowded, thyrsoid ; capsules coriaceous, tomentose, 4-seeded ; seeds arillate, bright scarlet. Alto Queta ; fr. July and August 1855. COLL. CARP. 351. Fruit 4-valved, 2 valves usually cohering. Alto Queta, in forests, August 1855. COLL. CARP. 352.

Var. *β*. **grandiflora** C. DC. in DC., *l.c.*, p. 660.

GOLUNGO ALTO.—A highly frondose tree, 30 to 60 ft. high ; wood valuable ; adult leaflets coriaceous ; flowers fleshy, whitish, scented like those of *Citrus Aurantium* L. ; filaments very broad, bicuspidate, bearing the anthers in the sinus. In the more elevated mountainous places in

Serra de Alto Queta, fl. March 1855. No. **1308.** A tree, 25 to 38 ft. high; trunk straight; timber good but not durable. Native name "Páo Caxique" (Mafura). Occasional, near streams, in the wooded parts of Serra de Alto Queta, in the same locality as No. 1308; without either fl. or fr. Dec. 1854. No. **1308***b*.

4. **T. emetica** Vahl, Symb. Bot. i. p. 31 (1790); Oliv. Fl. Trop. Afr. i. p. 335; C. DC. in DC., *l.c.*, p. 660.

Mozambique.—Seeds. Coll. Carp. 316.

5. **T. grandifolia** Oliv., *l.c.*, p. 335. *T. grandiflora* C. DC. in DC., *l.c.*, p. 674.

Island of St. Thomas.—A small tree, in the elevated forests of the island; seeds, Dec. 1860. Coll. Carp. 314.

The absence of other parts of the plant renders the determination very doubtful.

7. **CARAPA** Aubl.; Benth. & Hook. f. Gen. Pl. i. p. 338.

1. **C. procera** DC. Prodr. i. p. 626 (1824); C. DC. in DC. Monogr. Phanerog. i. p. 716 (1878).

C. guyanensis Oliv. Fl. Trop. Afr. i. p. 336, non *C. guianensis* Aubl. *fide* C. DC., *l.c.* *Carapa* (sp.), Welw. Synopse, p. 11, n. 22. Meliacea, Welw., *l.c.*, p. 13, n. 30.

Golungo Alto.—A very elegant palm-shaped tree, 15 to 35 ft. high, with a trunk 1 to 2½ ft. diam. at the base, and in dense primitive woods attaining 50 ft., with trunk 3½ ft. diam.; branches spreading, long, curving upwards, naked below, towards the apex of the tree arranged in a candelabra-form and there crowded ascending bearing fascicles of leaves and flowering cymes; leaves gigantic, abruptly pinnate, 5-10-jugate, horizontally spreading, other leaves nodding as in palms; leaflets ¼ to 1 ft. long, thinly coriaceous, very glossy, paler beneath; inflorescence purple throughout; thyrses or panicles compound, often 2 ft. long, terminal; flowers coriaceous, whitish-rose, when less open greenish; calyx-segments 5, oblong, obtuse, coriaceous-fleshy, concave, turning red, overlapping a little, much shorter than the petals; petals 5, broadly ovate-oblong, narrowed at the base into a short claw, of the same consistence as the calyx, dark red, spreading at the time of flowering, soon reflexed; stamens monadelphous, combined into a whitish rather fleshy cup-shaped cylindrical tube 10-lobed at the apex, inserted around the base of the epigynous also cup-shaped but shorter disk; anthers 10, inserted between the lobes of the staminal tube, subsessile; ovary superior; style thick, conical, compressed towards the apex; stigma waxy-fleshy, tenacious, chestnut-brown, large, orbicular-peltate, with more or less reflexed margin; fruit subglobose, size of a man's fist, 5-costate, pyramidally acuminate at the apex; seeds in size and colour like those of *Edwardia lurida* Raf., tawny-red, rough. Timber strong, durable, taking an excellent polish, but consequently difficult to work. Certain individual trees appear never to bear fruit. Native name "Mucaça-Ncumbi," "Mukassan-kumbi," or "M-casa encumbi." In dense primitive and secondary woods of the mountains of Serra de Alto Queta, at the margins of streams, from Undelle to Camilungo, sporadic; fl. August, Sept. and Dec. 1854 and beginning of August 1855, fr. Sept. 1855. No. **1307**.

Not seen by Welwitsch in the littoral regions of Angola, but reported by him also from the districts of Cazengo, Dembos, Alto Dande, etc.

8. **KHAYA** A. Juss.; Benth. & Hook. f. Gen. Pl. i. p. 338.

1. **K. anthotheca** C. DC. in D.C. Monogr. Phanerog. i. p. 721 (1878). *Garretia anthoteca* Welw. Apont. p. 587, n. 49. *G. Anthotheca* Welw. Synopse p. 33, under n. 80. *Khaya ?*, sp. n., Welw. Synopse, p. 12, n. 26.

Golungo Alto, etc.—A majestic and beautiful tree, 30 to 60 ft. high and even higher; trunk 2 to 4 ft. in diam. at the base; timber aromatic, white, valuable, much like that of *Entandrophragma angolense*; bark the bitterest of all examined by Welwitsch in the interior of Angola, deserving attention for its antifebrile quality and as a succedaneum to quinine-bark; crown ovoid, glossy-frondose; branches patent or erect-patent, chiefly leafy towards the extremities; branchlets springing from the trunk and branches at a right angle, marked with scars. Leaves 5-10-jugate, caducous at the time of flowering, persistent during fruit, almost always much mutilated by insects; rachis reddish, near the base acutely winged; leaflets obovate, obtuse, cuspidate or emarginate, dry-coriaceous, hard, glossy, glaucous-greenish beneath; midrib acutely keeled, the lateral veins reddish. Panicles 1 to 2 ft. long, crowded at the ends of the branches, erect; primary and secondary peduncles compressed, 2-edged. Flowers white, tetramerous; sepals 4, reniform-rotundate, decussately imbricate, green, more or less scarious on the edges, several times shorter than the corolla; petals 4, convolute in the bud as well as in flower, erect, ventricose-concave. Stamens combined into a ventricose-cylindrical tube as long as the petals and closed at the orifice of the tube by means of the peltate-discoid stigma; staminal tube 8-toothed; teeth obtuse, convolute, connivent in flower towards the margin of the stigma; filaments almost obsolete; anthers 8, attached a little below the teeth of the tube and alternating with them, dark brown, shortly oblong, introrse, 2-celled, dehiscing longitudinally; disk large, orange-coloured, rather flat, surrounding like a ring the base of the ovary; ovary conical, 4-celled, dilated at the apex into a thick discoid rather flat radiate stigma, stigmatose at the margin. Native name "Cababa" or "Quibaba" of Mussengue or of Hungo. *Cissus aralioides* Pl. (Welw. Herb. 1484) climbs upon this species. In the more elevated primitive woods of the mountains of Serra de Alto Queta; fl. 18 Nov. 1855, fr. Feb. 1856. No. **1314**. Fruit capsular, size of a hen's egg, woody, septifragal from the apex; valves 4, ovate-acuminate, bi-lamellate (one layer septiferous with the tetragonous axis), almost simulating a flower. In the primitive forests of the districts Golungo Alto and Dembos, especially in Sobato Mussengue; seeds at the end of June 1857 and fully ripe in July 1857. Coll. Carp. 317. Bark and fruit, Coll. Carp. 318.

The species occurs in great abundance in the district of the Mahungos. It is the plant referred to by Welwitsch, Apont. p. 561 under n. 144, as forming a new genus of Cedrelaceæ.

9. **ENTANDROPHRAGMA** C. DC. in Bull. Herb. Boiss. ii. p. 582, t. 21 (Sept. 1894).

1. **E. angolense** C. DC., *l.c.*

Swietenia angolensis Welw. Apont. p. 561 under n. 144, p. 587, n. 46; Welw. Synopse, p. 11, n. 21, p. 31, n. 75; C. DC. in DC. Monogr. Phanerog. i. p. 724 (1878).

Golungo Alto.—An immense lofty very beautiful tree with deciduous leaves; bark bitter and astringent; trunk 3 or 4 ft. diam.;

branches patent elongated. Flowers small, paniculate, pentamerous, white ; petals erect, sinistrorsely convolute in æstivation (as seen from above) ; staminal tube obtusely crenate-lobed ; anthers exserted ; disk obsolete. Capsule pendulous when ripe, oblong-cylindrical, obtusely pentagonal, 6 to 8 in. long by 1 to 2 in. thick in the middle, attenuated at both ends, pyramidal at the apex, 5-celled, septifragally 5-valved from the base ; valves bi-lamellate with adhering laminæ or uni-lamellate, exposing the septiferous acutely pentagonal seminiferous axis, hard-woody, cohering at the vertex, deciduous in the form of a calyptra, then separately arching outwards ; seeds 20 to 30, that is, 4 to 6 pendulous on each face of the placenta, with long wings ; wings lanceolate, obtuse ; nucleus nearly square. Native name "Quibaba" of Queta. In the primitive forests of the mountains of Serra de Queta Central, chiefly adorning damp depressions near streams ; fl. in Jan. and Feb., with ripe fr. at the beginning of August 1856. No. **1313**. At about 2000 ft. alt. Fr. August 1856. COLL. CARP. 311. Bark "Quibaba quina." COLL. CARP. 319. This gigantic tree grows to a height of 140 ft., with a trunk more than 30 ft. in circumference ; and its timber is in great repute for various domestic articles, furniture, etc., not only on account of the satiny lustre and high polish which it takes, but also for its durability and facility of working ; the bark contains a very bitter principle, and furnishes a substitute for quinine well worth the attention of pharmacists. Quibaba is derived from Quiba, which means bark. (Welwitsch, Synopse, p. 11 n. 21, p. 31 n. 75.)

XXXV. DICHAPETALACEÆ.

The species are shrubs or small trees belonging to the genus *Dichapetalum*, and are remarkable for the horizontal ramification which prevails in nearly all of them ; they inhabit the dense and moist primitive woods of the warmer and more sheltered situations, constituting, together with Rubiaceæ, Anonaceæ, and Ferns, the undergrowth of such woods ; most of them are climbers. The circumstance that they rarely produce flowers, and still more rarely mature their fruits, renders very difficult the exact definition of the species, the more so because the leaves of each species vary considerably according to the age and circumstances of the individual (Welwitsch, Apont. p. 563, n. 152). No species are known to occur in either of the districts of Benguella, Mossamedes, or Huilla.

1. **DICHAPETALUM** Thou. Gen. Nov. Madag. p. 23 (1809).
Chailletia DC. (1811) ; Benth. & Hook. f. Gen. Pl. i. p. 341.

1. **D. subsessilifolium** Chodat in Bull. Hb. Boiss. iii. p. 671 (1895).

GOLUNGO ALTO.—A widely and extensively climbing slender evergreen shrub ; stem tortuous ; branchlets diffuse, elongated, hirsute with ferruginous spreading hispid hairs ; leaves obovate-elliptical, acuminate, unequally cordate or nearly rounded at the base, papery-coriaceous, glossy and glabrate or scattered with hairs especially along the midrib and principal nerves above, paler and scattered with hairs beneath, 3 to 5½ by 1 to 2½ in. ; petiole $\frac{1}{12}$ to $\frac{1}{8}$ in. long, hirsute ; stipules setaceous-subulate, rather longer than the petiole, deciduous ; flowers clustered in the axils of the leaves, sessile, white, several together, $\frac{1}{5}$ in. long ; calyx half the length of the flower ; segments 5,

ovate or lanceolate, rather hairy outside, unequal, erect; petals 5, spathulate, glabrous, with a long claw, erect; blade deeply bifid; stamens 5, equalling the petals; filaments rather tapering upwards; anthers 5, small; style as long as the filaments, 3-lobed at the apex, glabrous; ovary mostly inferior, hairy at the apex, small. In the very dense more elevated primitive woods of Sobato de Quilombo-Quiacatubia, but rather rarely met with (also in Quisuculo); fl. April 1856. No. **4662**. In the primitive woods of Serra de Alto Queta; in flower-bud, May 1856. No. **469**.

2. **D. umbellatum** Chodat, *l.c.*, p. 671.

Golungo Alto.—A tall and widely climbing shrub with very long rambling branches, gracefully pendulous from lofty trees; branchlets patent, covered with a short velvety ferruginous tomentum; leaves oval, cuspidate or emarginate, unequally cordate or subcordate at the base, thinly coriaceous, rather harshly velvety with ferruginous hairs especially beneath when young, at length nearly glabrous above and scattered with short hispid hairs along the midrib nerves and net-veins beneath, otherwise of nearly the same colour on both surfaces, 2 to 6 by 1 to 3 in.; margin rather undulated or subrepand; petiole short, not exceeding $\frac{1}{8}$ in., shortly and closely hairy; stipules subulate, equalling or rather exceeding the petiole, deciduous; flowers clustered, many together, subsessile, in axillary and subterminal pedunculate heads, milk-white with a tinge of blue; common peduncle ranging up to nearly 1 in. long, subtomentose; calyx-lobes ovate; petals exceeding the calyx, with a long claw; filaments long; ovary mostly superior. Fruit not known. In very dense primitive woods, at Capopa; in scarce fl. March 1855. No. **4651**. In the more elevated woods near Capopa; fl. Nov. and Dec. 1855. No. **4652**. Frequent, in the more elevated woods, near Capopa; fl. Feb. 1856, not fruiting in that year. No. **4653**. Capopa; in flower-bud, August 1856. No. **4654**.

3. **D. angolense** Chodat, *l.c.*, p. 672.

Golungo Alto.—A robust shrub, climbing widely and to a considerable height, afterwards pendulous; branches spreading, glabrescent; branchlets patent, covered with a tawny curly tomentum; leaves more or less obliquely elliptical, acuminate, unequally cordate or subcordate at the base, softly coriaceous, dark-green rather glossy and glabrescent or puberulous above, paler and sub-tomentose beneath, $2\frac{1}{2}$ to 7 by $1\frac{1}{3}$ to 3 in.; midrib lateral nerves and net-veins clearly marked on the lower surface; petiole $\frac{1}{6}$ to $\frac{1}{4}$ in. or those associated with the inflorescence longer; stipules caducous, subulate; inflorescence densely paniculate, many-flowered, laxer in fruit, sub-corymbose, 1 to 2 in. long in flower, ranging up to 4 in. in fruit; peduncle inserted on or adnate to the petiole of a leaf starting from near its apex; flowers small, shortly pedicellate; calyx-segments oval, obtuse, about $\frac{1}{15}$ in. long, tomentose outside, glabrous inside; petals obovate-oblong, glabrous, not much exceeding the calyx, bilobed, not clawed; anthers 5; ovary densely hairy, superior; style slender like the filaments, glabrous; stigma small, 3-lobed; fruits numerous, sub-globose, pulpy, $\frac{1}{2}$ in. diam. or rather larger, grey-tawny-tomentose, 2-3-celled; cells 1-seeded; pulp viscid; seeds attached along a long narrow surface on the inner side at and adjoining the apex; cotyledons thick, applied together along an angular surface; radicle minute, superior. In the primitive woods of the mountains of Serra de Alto Queta in company with *Napoleona* (Welw. Herb. 4592) and *Tetracera alnifolia* Willd. (Welw. Herb. 1203); fr. end of April 1856. No. **4664**.

CAZENGO.—A subscandent shrub; leaves rather rigid, deep-green above. In primitive forests near Cacula and Cambondo; in flower-bud June 1855. No. **4663.**

4. **D. crassifolium** Chodat, *l.c.*, p. 672.

A robust scandent shrub with spreading branches, glabrescent except the flowering and fruiting parts; leaves oval, obtusely cuspidate or apiculate, obtuse or wedge-shaped at the base, toughly coriaceous, glossy, of nearly the same colour on both surfaces, $2\frac{1}{2}$ to $5\frac{1}{2}$ by $1\frac{1}{2}$ to 3 in.; lateral veins 4 to 6 on each side of the mid-rib, as well as the net-veins clearly marked on the lower surface, less conspicuous on the upper surface; petiole $\frac{1}{4}$ to $\frac{3}{8}$ in.; stipules very caducous; flowers clustered in dense cymes, in the axils and at the extremities of the branchlets, ashy-milk-white and very shortly tomentose in bud; common peduncle ranging in fruit up to nearly 1 in., shorter in flower; pedicels in fruit ranging up to $\frac{1}{8}$ in., very short in flower-bud; buds globose, small; petals 5, a little longer than the calyx-segments, faintly emarginate in the bud, not clawed as shown by the remains on the fruit; ovary superior, hairy, 3-celled; style 3-lobed at the apex; ovules germinate, laterally attached, ascending ?, collateral; fruit 1-2- or very rarely 3-lobed, usually 1-lobed, covered with a short pale-tawny subcanescent evanescent tomentum, turning red; lobes obovoid, oblique, about 1 in. long, 1-celled, based by the persistent calyx and often also by the remains of the petals and stamens; remains of the style lateral.

CAZENGO.—In the primitive woods of Cabondo; in flower-bud and fruit, June 1855. No. **4665.**

PUNGO ANDONGO.—In shady places among rocks by thickets within the fortress; with young fruit in the middle of Nov. 1856. No. **4666.**

5. **D. fructuosum** Hiern, sp. n.

A scandent shrub, glabrescent except the puberulous extremities and the (flowering and) fruiting parts; branchlets erect-patent; leaves elliptical, prolonged at the apex into an obtuse acumen, somewhat narrowed or more or less wedge-shaped at the base, firmly coriaceous, glossy and sub-glaucescent on both surfaces, 2 to 4 by $\frac{3}{4}$ to 2 in.; petiole $\frac{1}{6}$ to $\frac{1}{5}$ in. long; stipules subulate, about $\frac{1}{10}$ in. long, deciduous; infructescence lax, axillary and subterminal, forming somewhat leafy and quasi-terminal panicles; primary peduncle of each axillary cyme about 1 in. long; young fruits numerous, ventricosely oval, rather compressed, about $\frac{1}{2}$ in. long, $\frac{1}{3}$ to $\frac{2}{5}$ in. broad, $\frac{1}{5}$ to $\frac{1}{4}$ in. thick (in the dry state), red, shortly and closely hairy, 1-celled, 1-seeded; remains of calyx inferior, sub-lateral; remains of style sub-lateral; seed is in the genus.

CAZENGO.—In primitive woods near Cabondo, in company with *Clematis pseudograndiflora* O. Kuntz (Welw. Herb. 1218) and *Coffea*: in young fruit, June 1855. No. **1233.**

6. **D hypoleucum** Hiern, sp. n.

Branchlets patent, glabrescent below, at the extremities clothed

with a thin appressed whitish tomentum; leaves elliptical, acuminate, apiculate, rounded or obtusely narrowed at the base, papery-coriaceous, glabrous shining and deep green above, clothed with a whitish very short tomentum beneath, subrepand, 3 to $5\frac{1}{2}$ by $1\frac{1}{4}$ to $2\frac{1}{4}$ in.; midrib nerves and net-veins clearly marked beneath; petiole thickened, $\frac{1}{5}$ to $\frac{1}{4}$ in. long; stipules subulate, nearly equalling the petiole, deciduous; infructescence axillary and subterminal, shortly pedunculate, bracteate; fruiting pedicels thickened, $\frac{1}{5}$ to $\frac{1}{4}$ in. long, subsolitary, amidst numerous crowded densely cymose slender barren pedicels, thinly hairy; fruit subglobose, nearly $\frac{1}{2}$ in. diam., densely hispid.

Without locality noted in Herb. Welw. No. **4667**.

7. **D. retroversum** Hiern, sp. n.

A slender widely climbing evergreen shrub; stems often twisted even from the base, as well as the branches white-verrucose, rigid; branches patent or curving backwards; branchlets pubescent-tomentose with brown hairs, more or less bent backwards; leaves ovate elliptical or lanceolate, acuminate, obtuse or subapiculate at the apex, rounded or emarginate at the base, thinly coriaceous or rigidly membranous, glabrescent and rather glossy above, paler and with raised pubescent or puberulous midrib and nervation beneath, $1\frac{1}{2}$ to 5 by $\frac{2}{5}$ to $1\frac{3}{4}$ in.; margin narrowly revolute, puberulous or glabrate; petiole patent, pubescent, $\frac{1}{12}$ to $\frac{1}{5}$ in. long; stipules 2, one on each side of the petiole, lanceolate-subulate, taper-pointed, erect, $\frac{1}{8}$ to $\frac{1}{6}$ in. long, deciduous; flower-buds white; umbels axillary, simple; common peduncle solitary, erect-patent spreading or at length pendulous, pubescent, $\frac{1}{8}$ to $\frac{3}{4}$ in. long; pedicels $\frac{1}{12}$ to $\frac{1}{8}$ in. long, few or several together, pubescent; flowers white, hermaphrodite; calyx-segments oval-oblong, pubescent outside, subequal, about $\frac{1}{12}$ in. long, 5 or rarely 6; petals cuneate-obovate, sub-unguiculate, bifid, about $\frac{1}{10}$ in. long; lobes linear-spathulate; hypogynous glands opposite to the petals, truncate, obsoletely 3-dentate at the apex; filaments filiform, longer than the petals; anthers reniform, small; ovary superior, narrowly conical, hispid with brown hairs, gradually terminating in the glabrate filiform style which about equals the filaments; stigma small, obsoletely 2-3-lobed; fruit ellipsoidal, attenuate at both ends or at least at the apex, ventricose in the middle, longitudinally subangular, of a fine scarlet colour, of the form and colour as well as the size of the hip of *Rosa canina* L., fleshy-pulpy, rather sweet to the taste, edible, 1-celled, 1-seeded, sub-pendulous, with the calyx and the remains of the stamens persisting at the base.

Golungo Alto.—In the dense woods of Sobato de Cabanga Cacalunga, but sparingly; in flower-bud and fruit, March 1858. No. **4655**. In very dense primitive woods, intermixed with other shrubs; fl. Jan. 1856. No. **4656**. In the woods of Serra de Alto Queta, Mata de Mangue; with few flowers and fruits, August 1855. No. **4657**. In the dense primitive woods of the Eastern Queta: frequent but very rarely fruiting, April 1856. No. **4658**. In shady

places in Eastern Queta ; in flower-bud, Jan. 1856. No. **4659**. In the very dense woods of the mountains of Serra de Alto Queta, in Mata de Mangue ; fl. end of May 1856. No. **4660**. Sange ; in young fl. and fr. 11 June 1856. No. **4661**.

The following must be compared with *Dichapetalum* :—

Golungo Alto.—A bush 5 to 8 ft. high ; trunk straight, slender, erect, 1 to 1½ in. thick ; branches spreading, subscandent ; flower-buds whitish, silky. In the dense primitive forests of the mountains of Queta Central, at Zengas de Queta ; without fl. beginning of August 1858. No. **4668**.

The next five Nos., which are closely related among themselves, are very doubtfully placed in this genus :—

Golungo Alto.—A patently branched bush ; leaves sub-membranous or very thinly coriaceous, wavy at the margin in the living state, axillary buds red. In the thickets of the mountains of Alto Queta ; without fl. June 1856. No. **542**. A shrub, 1½ to 3 ft. high, much branched from the base, apparently a secondary shoot of a larger perhaps scandent shrub ; habit like *Combretum*, but the leaves are alternate. On the sides of the Ambaca road near Camilungo ; without fl. Nov. 1855. No. **3018**. A low shrub with ferruginous-hirsute almost horizontal branches. By thickets and the sides of roads between Sange and Ponte de Felix Simões ; without fl. August 1855. No. **3019**. Queta, without fl. 1 August 1856. No. **4696**. A low shrub growing in a cæspitose manner, probably the radical shoot of a burnt tree. On the sides of the road between Cambondo and Trombeta ; without fl. June 1855. No. **4697**.

XXXVI. OLACINEÆ.

The Olacineæ of Angola are shrubs or small trees, but little conspicuous, and are met with especially in the dense woods of the hilly regions (Welw. Apont. p. 560, n. 141). Welwitsch observed that in several Olacineæ examined by him the style is subexcentric and curved, as for example in *Apodytes dimidiata* E. Mey.

1. **HEISTERIA** Jacq. ; Benth. & Hook. f. Gen. Pl. i. p. 346.

1. **H. parvifolia** Smith in Rees Cycl. xvii. n. 3 (1811) ; Oliv. Fl. Trop. Afr. i. p. 346 ; vel affinis.

Island of St. Thomas.—In the more elevated primitive forests in the ascent to Fazenda do Monte Caffé, sporadic ; with very few young fr., Dec. 1860. No. **1114**.

2. **XIMENIA** Plum., L. ; Benth. & Hook. f. Gen. Pl. i. p. 346.

1. **X. americana** L. Sp. Pl. edit. 1, p. 1193 (1753) ; Oliv. Fl. Trop. Afr. i. p. 346 ; Grant in Trans. Linn. Soc. Lond. xxix. p. 46 (1873) ; Monteiro, Angola, vol. ii. p. 195 (1875).

X. spinosa Salisb. Prodr. Stirp. Hort. Chapel Allert. p. 276 (1796). *Ximenia* (sp.), Welw. Synopse, p. 34, n. 87.

Golungo Alto (and Cazengo).—A much-branched spinous leafy evergreen tree with the habit of a lemon or of a Tangerine orange, 15 to 20 ft. high ; leaves fleshy-coriaceous, fragile, deep green-glossy above,

paler nearly glaucous beneath, not punctate; petals greenish-yellow; filaments whitish-hyaline, flattened, a little shorter than the petals, spirally twisted at the apex; anthers yellow, basifixed: ovary nut-shaped, sessile, scrobiculate on the thicker portion, surmounted by a smooth conical process; stigma obsoletely 4-angled; stigma small, capitate; drupe the size of a pigeon's egg, yellow both outside and inside, juicy, with smell of cyanic acid; seed large, obovoid, very oily. No animal touches the fruit, and the crushed rind is frequently applied by the negroes to the sores of domestic animals to keep off the flies. Native name "Muhinge" or "Mohinge." In primitive woods throughout nearly the whole district but usually sporadic, fl. Nov. 1855; by the river Delamboa near Sange in ripe fr. Dec. 1855 and Feb. and March 1856. No. **1122**. Coll. Carp. 322, 323, 324. Unripe fruit green. At the margins of the primitive woods of Sobato de Mussengue but rare, May 1855. No. **1123**.

Mossamedes.—A small tree or a robust hard glaucescent arborescent shrub, spinous, in some places with deciduous in others with persistent leaves; fruit egg-shaped, 1½ in. long, 1 in. thick, of an orange colour; frequent in thickets almost throughout the district from Mossamedes to Bumbo, by the banks of the river Maiombo in sandy places, in fr. and other specimens in fl. Oct. 1859. Native name "Umpeque." No. **1130**. Coll. Carp. 321.

The seeds of the fruits contain a very savoury kernel, from which the natives of Mossamedes extract an oil which they employ at the time of their feasts and also for anointing their bodies and for daubing their hair. Being very abundant and easily propagated, the species is well worthy of the attention of those who study oil-producing plants (Welwitsch, Synopse, p. 34, n. 87).

The seeds also can be used in the making of a kind of marasquino. Schweinfurth, *Heart of Africa*, vol. i., p. 192, states that the blossoms emit a soft fragrance as of orange flowers, and that the shrub bears a round yellow fruit about the size of a cherry which is nearly as sour as anything in nature. The flavour is like a citron, and the soft nut-like kernel is eaten with the juicy pulp.

Var. *β*. **microphylla** (Welwitsch), Oliv., *l.c.*, i. p. 347.

A rigid shrub, 2 to 4 ft. high, very glaucous in all parts, virgately branched, not uncommonly adorned with species of *Loranthus*; leaves rather fleshy; flowers whitish-rose.

Bumbo.—Frequent in bushy places at the skirts of the woods about the base of Serra da Xella, fl. Oct. 1859. No. **1127**.

3. **OLAX** L.; Benth. & Hook. f. Gen. Pl. i. p. 347.

1. **O. viridis** Oliv. Fl. Trop. Afr. i. p. 349.

Golungo Alto.—A low shrub, 2 to 4 ft. high; branches thin, tortuous, green, sulcate-angular; leaves evergreen, thinly fleshy-coriaceous, glossy above; flowers rather obtuse; calyx cupuliform, obtusely denticulate, with a truncate margin, green, inferior, not accrescent; corolla white, areolate; petals 5, cohering up to the middle; stamens 8, but usually only 3 fertile, the latter alternate with the petals, inserted below the throat of the corolla, included; fertile anthers introrse, 2-celled, dehiscing longitudinally; filaments flattened; sterile stamens 5, opposite to the petals. The corolla appears as if made of milk-white transparent wax, so that the yellow anthers which are placed in the upper and thinner portion of the tube shine through the corolla-wall; the corolla falls off like the calyptra of a moss, circumscissile at the

base and slit open with a longitudinal fissure, sympetalous up to the middle. Disk cupuliform ; ovary whitish, ovoid-conical, more or less angular, borne on a very short disk-like gynophore, 1-celled ; style rather firm, nearly as long as the rest of the pistil, whitish ; stigma obsoletely 3-lobed ; ovules usually 3, pendulous, 1 or 2 much larger than the others ; drupe red when ripe, green when young, spherical, apiculate at the top with the remains of the style, at the base closely adhering to the disk-shaped not enlarged calyx ; seed solitary ; testa rather hard, whitish. In shady woods throughout nearly the whole district of Alto Queta ; Mata de Mangues, fl. Nov. 1855 ; near N-delle, fr. beginning of July 1855. No. **1124.** A low twisted shrub ; branchlets green ; leaves thinly coriaceous, evergreen, dark green, glossy on both surfaces ; corolla white, rather fleshy, campanulate ; segments reflexed at the time of flowering ; anthers yellow, exserted. In shady woods, near Capopa ; fl. end of Dec. 1855. A narrow-leaved form. No. **1124***b*.

Dembos.—In very dense primitive woods at the right bank of the river Zenza ; fl. Feb. 1856. No. **1125.**

Pungo Andongo.—A little shrub, 2 ft. high, with green stem and spreading branches ; ripe drupes red. In the shaded rocky spots of Barranco da Pedra Songue ; fl. beginning of March 1857. No. **1126.**

Under the last No. are specimens of the same species with red fruits, collected at Quibolo in the district of Golungo Alto in July 1856.

4. **OPILIA** Roxb. ; Benth. & Hook. f. Gen. Pl. i. p. 350.

1. **O. amentacea** Roxb. Pl. Coromand. ii. p. 31, t. 158 (1798) ; Oliv. Fl. Trop. Afr. i. p. 352.

Pungo Andongo.—A climbing shrub ; leaves fleshy-coriaceous, thick, rigid, deciduous at the time of flowering, fragile ; flowers yellowish ; fruits at first green, afterwards turning red ; embryo minute, nestling in the top of the albumen. Freely climbing on the plant called "Mussondo," *Pseudospondias microcarpa* Engl. (Welw. Herb. 4453–4455). In the rocky parts of Barrancos de Catete within the stronghold, sparingly ; fl. May 1857, fr. Dec. 1856. No. **470.**

5. **APODYTES** E. Meyer ; Benth. & Hook. f. Gen. Pl. i. p. 351.

1. **A. dimidiata** E. Mey. ex Arnott in Hook. Journ. Bot. iii. p. 155 (1841) ; Oliv. Fl. Trop. Afr. i. p. 355.

Hemilobium ficifolium Welw. Synopse, p. 20, n. 49 (1862).

Huilla.—A tree, 15 to 30 ft. high or more ; trunk straight, $\frac{1}{3}$ to $\frac{1}{2}$ ft. diam., rarely attaining $1\frac{1}{2}$ ft. diam. ; habit almost exactly like that of *Ficus Benjamina* L. ; wood whitish, dense, firm, good and durable, with very fine grain ; branches sub-patent ; branchlets rather nodding, the younger ones erect-patent ; leaves evergreen, coriaceous, glossy, deep-green, a little paler beneath ; flowers white, very pleasantly and powerfully fragrant, with an aroma like that of Syringa and orange, arranged in leaf-opposed panicles ; calyx small, 5-toothed or with 1 or 2 teeth obsolete ; petals 4 or more frequently 5, hypogynous, rigidly rather fleshy, not hairy inside, valvate in æstivation, spreading at the time of flowering ; stamens 5 or more rarely 4 or very rarely 3, free, hypogynous ; filaments flattened from the base, gradually thick-filiform, erect ; anthers introrse, narrowly cordate-oblong, attached at the sinus of the back, at first erect but soon versatile, dehiscing longitudinally ; ovary free, collaterally 2-celled ; ovules solitary, pendulous from the apex at the inner angle of each cell, anatropous ; style excentric, curved at the base,

filiform; stigma truncate-capitate or rarely bilobed; very rarely there are two styles, or one style bipartite to the base; fruit (immature) drupaceous, 1- or very rarely 2-lobed; lobes obovate, compressed, horizontally diverging when 2, the second lobe usually sub-obsolete and marked by its recurved style on one side of the base of the developed lobe; seed (immature) pendulous, obovate, rather compressed; testa membranous; umbilicus basilar, looking towards the insertion of the style; albumen white, copious, loosely fleshy; embryo very small; radicle superior, next the umbilicus. In damp elevated woods, at an elevation of 5100 to 5300 ft., in Morro de Lopollo and near Humpata; fl. and young fr. from Dec. 1859 to Feb. 1860. No. **1128**. A tree, 20 to 25 ft. high, with dilated crown, with the aspect nearly of a species of *Ficus* (Herb. 6351). This tree furnishes good wood for handles of agricultural implements, etc., and is strong, tenacious and very durable. In the elevated woods above Lopollo in the direction of Humpata, at an elevation of 5200 to 5500 ft.; without fl. or fr. Jan. 1860. No. **1129.**

The name of this tree employed by the Portuguese colonists in Huilla is "Figueira brava" (wild fig-tree).

6. **IODES** Blume; Benth. & Hook. f. Gen. Pl. i. p. 355.

1. **I. africana** Welw. ex Oliv. Fl. Trop. Afr. i. p. 358.

Golungo Alto.—A widely scandent shrub; stem narrowed; with short spreading hispidulous rather rigid hairs; leaves membranous, dark-green and rather glossy above, rather pale beneath; petiole strigulose-hispid; tendrils inter-petiolar; flowers greenish-white; calyx of female flowers 5-cleft; ovary sessile, 1-celled, more or less pilose, crowned with a large, thick, peltate-reniform stigma; ovules 2, pendulous. At the bushy borders of primitive woods, in the valley of Quibixe, sporadic; with young female fl. Feb. and March 1856. No. **1506**.

Cazengo.—A weak extensively sarmentose shrub or a far and high climbing herb, glabrate in most parts. In thickets along the river Luinha near Aguas doces, at an elevation of 1800 to 2000 ft.; in flower-bud, June 1855. No. **1507.**

The two following plants in flower-bud or young flower should be compared with *Strombosia* Bl., Benth. & Hook. Gen. Pl. i. p. 348; they are apparently undescribed species:—

Pungo Andongo.—A robust extensively climbing shrub with short trunk 2 in. in. diam., and thickly coriaceous glossy leaves paler beneath. In the rather elevated thickets of Barrancos de Pedra Cazella; in flower-bud, April 1857. No. **460.**

Bumbo.—A rigid twisted shrub, nearly leafless at the time of gathering; leaves rather fleshy, brittle. In hilly bushy places, near the upper limit of the littoral region, at the base of Serra da Xella, in the domain of Unteate, rather rare between Quitive and Bumbo; in young fl. Oct. 1859. No. **468.**

XXXVII. ILICINEÆ.

1. **ILEX** L.; Benth. & Hook. f. Gen. Pl. i. p. 356.

1. **I. capensis** Sond. & Harv. in Harv. & Sond. Fl. Cap. i. p. 473 (1860); Oliv. Fl. Trop. Afr. i. p. 359.

Sideroxylon mile L. Syst. Veg. edit. 12, p. 178 (1767). *I. mitis* Radlk. in Report, Brit. Ass. 1885, p. 1081 (1886).

Huilla.—A little tree, 8 to 12 ft. high, forming a crown at the top, with spreading ramification; leaves evergreen, coriaceous, glossy, paler beneath; margin callous-entire; flowers hermaphrodite; calyx 6-cleft; corolla sympetalous, milk-white, 6-, very rarely 7-cleft; stamens 6; ovary 6-celled; stigmas 6, sessile, straight, united into a thick hexagonal column. In the very elevated woods of Morro de Lopollo, behind Sambo do Ferrão, at 5500 to 5600 ft. of altitude; fl. Dec. 1859, in young fr. Feb. 1860. No. **1443**.

In South Africa the leaves of this plant are sometimes used for tea (Burchell mss.).

Coll. Carp. 325 contains English specimens of fruits of *Ilex Aquifolium* L. collected in Nov. 1869 for comparison.

XXXVIII. CELASTRACEÆ.

In the mountainous districts several species of *Gymnosporia* occur, which are mostly small trees or bushes inhabiting dry and exposed situations among hills or else places destitute of other arboreous vegetation; in the coast region of Angola proper and also in the districts of Huilla and Bumbo a species of *Elæodendron* is occasionally met with. The species of the tribe Hippocrateæ are handsome shrubby climbers of a varied and for the most part of a glaucous foliage; in the coast region of Loanda and also in the district of Bumbo a species climbs on *Adansonia digitata*; in the mountainous and highland districts several species of *Hippocratea* and *Salacia* form at times impenetrable thickets at the borders of streams and primitive forests; and in Pungo Andongo a species of *Salacia* produces edible fruits as large as a pear. (See Welw. Apont. p. 562, n. 149, and p. 563, n. 150.)

1. **CELASTRUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 364.

1. **C. cassinoides** L'Hérit. Sert. Angl. p. 6, t. 10 (1788).
Catha Dryandri Lowe, Man. Fl. Madeir. p. 107 (1862).

Madeira Island.—A small cultivated tree, 5 to 7 ft. high; near Funchal, without either fl. or fr. August 1853. No. **4616**.

The following specimen, also from Madeira, poorly represented and without flowers in the British Museum set, may be another form of the same variable species:—

A tall cultivated shrub, near Funchal, fl. August 1853. No. **4617**.

2. **GYMNOSPORIA** Wight. & Arn.; Benth. & Hook. f. Gen. Pl. i. p. 365.

1. **G. gracilipes** Loesener in Engl. Bot. Jahrb. xvii. p. 541 (1893).
Celastrus gracilipes Welw. ex Oliv. Fl. Trop. Afr. i. p. 361.

Golungo Alto.—An arborescent shrub; branches and spines purplish; leaves glossy; flowers white. In rocky bushy places at the skirts of primitive forests between Sange and Camilungo, very sporadic; fl. and fr. Dec. 1854. No. **1357**. A small tree; leaves ovate-lanceolate, membranous; spines very acute; capsule red-scarlet. Queta inferior; fr. Oct. 1855. Coll. Carp. 326. A tree of 15 to 20 ft.; trunk slender; branches spinous; leaves herbaceous-green, deciduous. Zenga do Queta; fr. June 1857. Coll. Carp. 328.

2. **G. andongensis** Loesener, *l.c.*, p. 541.
Celastrus andongensis Oliv. Fl. Trop. Afr. i. p. 361.

Pungo Andongo.—Branches lax and spreading. In thickets along the borders of woods in stony places, near Caghuy, sparingly ; fl. and fr., May 1857. No. **1351**. In sandy-stony spaces, by the roadside towards Cambambe ; fr., May 1857. No. **1353**.

3. **G. senegalensis** Loesener, *l.c.*, p. 541.
Celastrus senegalensis Lam. Encycl. Méth. i. p. 661 (1783); Oliv. Fl. Trop. Afr. i. p. 361.

Ambriz.—In rocky places along the sandy sea-shore, by the mouth of the river Loge near Ambriz ; fl. and fr. Nov. 1853. No. **1361**. A small tree, 6 to 7 ft. high, with long spines throughout ; on the stony slopes of Mossul, between Ambriz and Libongo ; without either fl. or fr. Nov. 1853. No. **1364**.

Loanda.—In the more arid shortly bushy hilly parts of the territory of Loanda, not uncommon ; fl. April 1854. No. **1349**. A shrub of 4 ft., sometimes shorter, bristling on all sides with spines ; in the dry shortly bushy places at Maianga do Povo, near the city of Loanda ; without either fl. or fr. Nov. 1857. No. **1352**. A small much-branched tree with the habit of *Cratægus*, or a shrub of 4 to 5 ft. or rarely as tall as a man, evergreen, bristling with stout spines ; branches whitish, striate ; flowers hermaphrodite, yellowish or white ; fruit red ; seeds erect, wrapped in a sulphur- or orange-coloured aril ; testa rather hard ; albumen copious ; embryo the height of the seed ; common throughout the district, in bushy hilly places, roadway near Quicuxe, fl. and fr. May 1858 ; at Penedo, fl. and young fr. 13 Oct. 1857. No. **1360**.

Icolo e Bengo.—In rather dry bushy spaces near Lagoa da Funda, after the fall of the flowers, Sept. 1857. No. **1350**.

Golungo Alto.—A small tree, 5 to 7 ft. high ; trunk 2 to 3 in. in diam. at the base, branched ; flowers of a pale sulphur-yellow colour. In the rather dry elevated reedy thickets of Sobato de Quilombo, fl. middle of July 1856. No. **6723**.

Zenza do Golungo.—A small tree, 7 to 10 ft. high, with spinous distorted branches and white flowers ; in stony tall-bushy hilly places between Calumguembo and Muchão, rather frequent ; in late fl. and in fr., Sept. 1854. No. **1354***a*. A small tree, 8 to 10 ft. high, with straight trunk, patent branches and whitish flowers ; ovary 3-celled ; in exposed as well as bushy stony dry wooded places, from the left bank of the river Chixe to Calumguembo, mountains of Mongollo, frequent, fl. Sept. 1857. No. **1354***b*.

Ambaca.—In hilly places on the left bank of the river Caringa, in company with a species of *Parinarium*, frequent but sterile ; June 1855. No. **1355**.

Pungo Andongo.—A tree, 15 ft. high, widely and divaricately branched ; trunk 8 in. in diam. at the base ; leaves arranged after the manner of the phyllodes of *Acacia*. In woods between the fortress and Sobato Cabanga Quiquetta, without either fl. or fr. Jan. 1857. No. **1356**.

Mossamedes.—A hard spinous shrub, apparently arborescent, with patent branches and branchlets and rose-whitish flowers. In dry mountainous rocky situations on the right bank of the river Maiombo at a place called A Cazimba, fl. Oct. 1859. No. **1267**. A shrub, 3 to 4 ft. high, of a glaucous-whitish hue, with white flowers. In stony declivities near Pomangala, in company with Capparideæ and *Balanites*, at an elevation of 500 to 600 ft., nearly without fl. Jan. 1860. No. **1362**.

Huilla.—A shrub, 1 to 1½ ft. high, with crowded stems, white

flowers and reddening fruit. In stony places along thickets near Mumpulla, sporadic ; fl. and fr. Oct. 1859. No. **1347**. A small tree, 6 to 8 ft. high, or occasionally a shrub of 4 ft. ; stems cæspitose, with straggling branches. In bushy stony hilly places between Mumpulla and Nene, fl. Oct. 1859. No. **1348**.

Some of the above-mentioned specimens, represented only by barren branches or otherwise, are of doubtful determination.

Var. **pumila** (Welw. ; Oliv., *l.c.*, p. 362).

Huilla.—Flowers white ; fruits scarlet-red. In bushy pastures and hilly places with short herbage, on the right bank of the river Lopollo, frequent ; fl. Oct. and Nov. 1859, fr. end of Jan. 1860. No. **1346**.

4. **G. euonymoides** Loesener, *l.c.*, p. 547.

Celastrus euonymoides Welw. ex Oliv. Fl. Trop. Afr. i. p. 362.

Golungo Alto.—A shrub, 3 to 4 ft. high, much branched ; branches twisted, even decumbent. In thin secondary woods by the borders of primitive forests ; fl. June 1855. No. **1358***a*. A shrub or small tree, with evergreen leaves ; fl. not yet seen. In dense forests between Calôlo and Trombeta, sparingly ; fr. Sept. 1854. Apparently this species. Coll. Carp. 333.

Zenga do Golungo.—A shrub, rarely a small tree, 7 to 8 ft. high, patently branched ; fruit purplish-scarlet. In stony bushy places near Calumguembo and Muchão ; fr. Sept. 1854. No. **1358***b*.

5. **G. lancifolia** Loesener, *l.c.*, p. 548.

Celastrus lancifolius Thonn. in Schum. Beskr. Guin. Pl. p. 132 (1827) ; Oliv. Fl. Trop. Afr. i. p. 364. *C. macrophyllus* Welw. ex Oliv., *l.c.*

Golungo Alto.—Seeds brick-red ; embryo two-thirds of the length of the albumen. In damp primitive woods along the banks of the river Coango, not at all common ; fl. July 1857. No. **1359***b*. Ripe fr. beginning of May 1856. No. **1359**. Coll. Carp. 327.

The following specimen, without developed flowers extant, appears to belong to this species :—

Golungo Alto.—A low shrub, apparently evergreen ; leaves coriaceous or subcoriaceous, alternate, more acuminate than in Nos. 1359, 1359*b* ; flower-buds rather small, clustered in the axils of the leaves. Rather rare, in the shaded parts of the elevated woods of Serra de Alto Queta, the leaves being nearly all eaten and mutilated by insects ; middle of August 1855. No. **1363**.

6. **G. huillensis** Loesener, *l.c.*, p. 548 ; non Szysz.

Celastrus huillensis Welw. ex Oliv. Fl. Trop. Afr. i. p. 364.

Huilla.—An evergreen, much-branched bush ; flowers hermaphrodite and mixed with male ones having a scarcely well-developed stigma, always greenish ; stigma rather 3-lobed than 3-partite. In elevated rocky parts of Morro de Lopollo ; fl. and young fr. May 1860. No. **1345**.

3. **ELÆODENDRON** Jacq. f. ; Benth. & Hook. f. Gen. Pl. i. p. 367.

1. **E. æthiopicum** Oliv. Fl. Trop. Afr. i. p. 365 ; Oliv. in Trans. Linn. Soc. Lond. xxix. p. 46, t. 21 (1872).

Cassine æthiopica Thunb. Fl. Cap. ii. p. 227 (1818) ; Loesener in Engl. Bot. Jahrb. xvii. p. 552. *Gymnosporia* (sp.), T. Thoms. in Speke, Journ., App., p. 629 (1863).

Loanda.—An evergreen shrub, 3 to 4 ft. high, branched from the base; leaves coriaceous, glossy, pallid beneath. In sandy secondary thickets at Museque de Sr. Schut, above the city of Loanda, rather rare; fl. 11 Dec. 1853. No. **1276**. A shrub, 4 to 7 ft. high; stems numerous, much-branched; branchlets grey; flowers small, whitish. In stony thickets between Quicuxe and Teba; fl. and fr. April and May 1854. No. **1275**; cf. No. **6736**.

Var. **pubescens** Oliv., *l.c.* *Cassine æthiopica* Th., var. b. *Burkeana* Loesener, *l.c.*

Huilla.—A hard shrub or a young tree. In little woods composed of Proteaceæ and Cæsalpinieæ, between Mumpulla and Nene; in young fr. Oct. 1859. No. **1269**. In stony bushy places between Lopollo and Nene, sparingly in fl. beginning of June 1860. No. **1270**. In wooded places at Mata do Monino, near Lopollo; in flower-bud April 1860. No. **1271**.

Bumbo.—An evergreen tree, 15 to 20 ft. high, with Rhamnoid habit; flowers greenish, feebly fragrant. In wooded parts of Serra da Xella; fl. and young fr. Oct. 1859. No. **4615**.

4. **CAMPYLOSTEMON** Welw.; Benth. & Hook. f. Gen. Pl. i. p. 998.

1. **C. angolense** Oliv. in Journ. Linn. Soc. x. p. 44 (1867); Benth. & Hook. f., *l.c.* (*Angolensis*); Welw. ex Oliv. Fl. Trop. Afr. i. p. 366.

Cazengo and Golungo Alto.—An extensively climbing shrub, with opposite long pendulous branches; stem and branches rather verrucose-rough, purplish; leaves quite entire at the base, from the middle towards the apex distantly serrate-dentate, thinly coriaceous, dark green above, a little paler beneath; midrib rather prominent, dark purple in the living state; flowers sulphur-coloured; calyx short, deeply 5-cleft, with obtuse lobes finely closely and acutely denticulate; petals 5, imbricate, rather fleshy; disk rather thick, flat, entire, scarcely angular and not sinuous at the tumid margin. In thickets along the banks of the river Luinha; fl. Dec. 1854. Also on the trees of the denser forests among the mountains near Ndele-Quibonga, etc., more rarely in Serra de Alto Queta; fl. end of Dec. 1855. No. **1331**.

5. **HIPPOCRATEA** L.; Benth. & Hook. f. Gen. Pl. i. p. 369.

1. **H. pallens** Planch. ex Oliv. Fl. Trop. Afr. i. p. 367.

Cazengo.—A shrub, arborescent at the base, climbing to a great height, then pendulous; flowers white, with a slight straw-coloured tinge. At the borders of primitive woods between Luinha and Palmira, also near Cambondo; fl. Jan. 1855. No. **1336**.

2. **H. Welwitschii** Oliv. Fl. Trop. Afr. i. p. 367.

Golungo Alto.—Leaves evergreen. At the borders of primitive woods along the left bank of the river Coango; fl. beginning of Dec. 1855, sporadic. No. **1322**. In the primitive woods of Alto Queta Oriental; with nearly ripe fr. June 1856. No. **1322***b*. In the more elevated woods of Serra de Alto Queta, with nearly ripe fr., and with the leaves almost altogether destroyed; June 1856. No. **1335**. Fr No. **6749**. Capsules narrow, spathulate. Quapopa; Sept. 1845 Coll. Carp. 329. An extensively climbing shrub; capsules linear elliptical, 2-valved; valves woody, green-glaucescent. Capopa; Sept. Oct., and Nov. 1855. Coll. Carp. 331.

3. **H. parvifolia** Oliv. Fl. Trop. Afr. i. p. 368.

Huilla.—A shrub extensively climbing, or sometimes erect and 1 to 2 ft. high. In mixed woods composed of Proteaceæ, Myrtaceæ, Loganiaceæ, etc., between Lopollo and Monino; fl. and fr. Jan. and Feb. 1860. No. **1325.**

4. **H. indica** Willd. Sp. Pl. i. p. 193 (1797); Oliv. Fl. Trop. Afr. i. p. 368.

Golungo Alto.—An immense climbing shrub; trunk 6 inches or usually 3 to 4 inches in diam. at the base; trailing shoots sometimes 30 to 40 ft. long, bright green at the apex, as are also the extremities of the branches and branchlets; leaves variable in form, elliptical ovate and nearly orbicular, obtuse and acuminate on the same plant, coriaceous, evergreen, obscurely green and polished above, pale green and less glossy beneath, midrib especially towards the base very prominent, margins decurrent into the petiole; flowers only occurring on the branches which hang down from trees, pale yellow, fragrant. The very tough and twisted stem of this liana is readily employed by the negroes for the construction of pig-sties, as the toughness of the stems offers a greater resistance to the pigs' teeth than other building-woods. In dense woods especially at their borders in Sobato de Serra de Alto Queta, Bango, Quilombo, etc.; fl. July 1855. Also near Quitondo Dec. 1854. Native name "N-Gunho." No. **1333**. A shrub climbing to a great height and variable in habit. Frequent along the border of the primitive woods of Quisucula, near Bango Aquitamba; fl. Jan. and Feb. 1855. No. **1334**. An evergreen shrub, sometimes scandent, sometimes nearly erect; leaves in the living state very glossy and almost varnished; flowers of a greenish-straw colour, but soon the whole inflorescence and also the young branchlets are clothed with a dark purple tinge. In bushy places at the skirts of the primitive woods of Serra de Alto Queta; fl. August 1855, in flower-bud March 1855. No. **1337**. A robust shrub, extensively climbing; leaves coriaceous, glossy; capsules very glaucous, as if scattered with white meal. In the less dense woods of Serra de Alto Queta; fr. August 1855. No. **1338**. A specimen from this district with foliage but without either fl. or fr. may perhaps belong to this species. No. **4650**. Alto Queta. Fr. July 1857. Coll. Carp. 330.

Pungo Andongo.—A scandent evergreen shrub; leaves coriaceous, glossy; flowers rather fleshy, yellowish. In bushy places along the banks of the river Luxillo; fl. beginning of Nov. 1856. No. **1324**.

5. **H. apocynoides** Welw. ex Oliv. Fl. Trop. Afr. i. p. 368.

Golungo Alto.—An extensively climbing shrub, simulating in the living state some species of Apocynaceæ as to habit and external aspect of the flowers; branches and branchlets spreading at right angles, ashy- or dusky-tomentose, occasionally spirally cirrhose and then thickened at that part, very tenacious; leaves thickly coriaceous, obovate, rather glossy above, paler beneath, entire or towards the apex denticulate; flowers greenish; calyx green-tomentose, rather fleshy, much shorter than the petals; petals 5, incurved around the base of flat thick disk, rather fleshy, green-tomentose, lanceolate, towards the apex channelled-subulate, half-patent at the time of flowering; stamens 3; filaments suddenly acuminate from a broad base girt by a dusky glandular spot, extrorsely involute at the apex, bearing thus the anthers out of sight; style conical, hyaline-stigmatose at the apex. In the primitive woods of Serra de Alto Queta, persisting for 2 or 3

months with unopened flower-buds ; fl. middle of Jan. 1856. No. **1328**. A shrub climbing to a great height ; flowers greenish. In woods near Capopa ; fl. and on the same branch very sparingly with fr. May 1856. No. **1328***b*. An evergreen shrub ; trailing shoots ferruginous-tomentose ; flowers greenish in bud. Not uncommon in the primitive woods of Capopa near the banks of the stream Delamboa ; in flower-bud Dec. 1855. No. **1328***c*.

Cazengo.—Climbing on trees ; leaves coriaceous, glossy ; flowers greenish. In the primitive woods of Cambondo, frequent ; fl. June 1855. No. **1329**.

6. **H. apiculata** Welw. ex Oliv. Fl. Trop. Afr. i. p. 369.

Golungo Alto.—A high-climbing shrub ; leaves dry-coriaceous, rather glossy ; flowers greenish. In the more elevated primitive woods of Serra de Alto Queta, sporadic ; fl. and young fr. June 1856 ; Zengas de Queta, fr., July and August 1856. No. **1323**.

7. **H. obtusifolia** Roxb. Hort. Beng. p. 5 (1814); Oliv., *l.c.*, p. 369.

Loanda.—A shrub, climbing to a great height ; twigs twining ; leaves coriaceous, shining ; flowers greenish. Frequent in bushy places around the city of Loanda, usually climbing on *Adansonia digitata* L., near Quicuxe and Praia de Zamba grande ; fl. July and August 1858, sparingly in fr. Jan. 1854. No. **1327**.

Bumbo.—In mixed woods near Chaõ da Xella, in Serra da Xella, sporadic, at an elevation of 3500 ft., fl. Oct. 1859. No. **1326**.

8. **H. graciliflora** Welw. ex Oliv. Fl. Trop. Afr. i. p. 371.

Golungo Alto.—Leaves thinly coriaceous, shining ; flowers greenish, without fragrance. In the more elevated primitive woods near Sange, at Fonte de Capopa, and along the banks of the river Delamboa ; fl. middle of Dec. 1855. No. **1332**.

9. **H. andongensis** Welw. ex Oliv. Fl. Trop. Afr. i. p. 371.

Pungo Andongo.—An evergreen scandent shrub, or by force of circumstances erect ; flowers yellow ; stamens 3 or very rarely 4. In bushy places at the base of elevated rocks between Catete and Luxillo ; fl. beginning of Nov. 1856. No. **1330**.

The following No., with the habit of the tribe Hippocrateæ, should be compared with this genus :—

Golungo Alto.—A stout shrub, climbing to a great height ; in the dense forests of Alto Queta, fr. (?) Oct. 1855. No. **3025**.

6. **SALACIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 370.

1. **S. elegans** Welw. ex Oliv. Fl. Trop. Afr. i. p. 373.

Pungo Andongo.—A widely scandent shrub, 4 to 8 ft. high or more ; bark sanguineous-purple ; branches and branchlets subalate-angular, thinly verrucose ; leaves very thinly coriaceous, nearly membranous, remarkably shining ; flowers small, green-yellowish. The flowers which are produced in the rainy season appear to be barren, as this plant was met with growing upon various trees and shrubs which flower twice in each year but only in the colder season perfect their fruit. In thickets near Luxillo and also in Barranco de Pedra Songue within the lines of fortification ; fl. June 1857. No. **1342**.

2. **S. macrocarpa** Welw. ex Oliv. Fl. Trop. Afr. i. p. 373.

Pungo Andongo.—A widely scandent shrub ; flowers yellowish

calyx-segments unequal; fruit baccate, pear-shaped, as large as a goose's egg, edible; seeds numerous, in three rows, horizontal, nearly as large as almonds, triquetrous-angular; testa very hard. In wooded thickets along streams near Cazella, within the lines of fortification, rather rare; fl. April 1857, fr. Dec. 1856. No. **1339.** A climbing shrub; fruit resembling that of "Matute." Coll. Carp. 332.

3. **S. cerasifera** Welw. ex Oliv. Fl. Trop. Afr. i. p. 376.

Pungo Andongo.—A handsome robust shrub, climbing far and widely; leaves rigidly coriaceous, shining; flowers yellow-greenish; fruits as large as a cherry or a little larger, bright orange-red. In wooded parts of Barranco de Pedra Songue, within the lines of the fortifications, rather rare; fl. Dec. 1856, fr. May 1857. No. **1340.**

The following apparently belongs to the same species:—

Pungo Andongo.—A shrub 8 ft. high with long slender branches, or perhaps the upgrowth of a mutilated tree. In the wooded parts of Barranco da Pedra Songue, sparingly; with white-yellowish flower-buds, end of April 1857. No. **466.**

4. **S. erecta** Walp. Rep. i. p. 402(1842); Oliv. Fl. Trop. Afr. i. 377.

Ambaca.—An evergreen much-branched shrub, 5 to 7 ft. high; branches sometimes sarmentose; leaves opposite, coriaceous, rather rigid, deep-green; fruit drupaceous, globose, tricostate. In bushy places along streams between Camilungo and Cabinda, and more abundantly between Cabinda and Isanga; with unripe fr. Oct. 1856. No. **1344.**

XXXIX. RHAMNEÆ.

Two species of *Zizyphus* grow in the open woods of the mountainous region, and one of them in the plateau region of Angola proper; both occur also in the district of Huilla, and they furnish edible fruits, more or less palatable. The most remarkable vegetable of this family is an herbaceous climber, with the habit of an *Aristolochia*; it was reported by Welwitsch as constituting a new genus, but has been identified with the Cape plant, *Helinus ovatus* E. Mey. (Welw. Apont. p. 563, n. 151).

1. **ZIZYPHUS** Tourn.; Benth. & Hook. f. Gen. Pl. i. p. 375.

1. **Z. Jujuba** Lam. Encycl. Méth. iii. p. 318 (1789) (*Ziziphus*); Hemsley in Oliv. Fl. Trop. Afr. i. p. 379.

Z. insularis Chr. Sm. in Tuck. Congo, p. 250 (1818). *Z. orthacantha* DC. Prodr. ii. p. 21 (1825); Schmidt Beitr. Fl. Cap. Verd. Ins. p. 302 (1852).

Cazengo.—A low tree with a broad head. Cazengo at the base of Muxaûlo; fr. June 1855. No. **6730.**

Golungo Alto.—A tree of 12 to 20 ft.; branches and crown lax. Abundant in open mixed woods between Sange and Trombeta; fl. Nov. 1855. No. **4608.**

Pungo Andongo.—A tree of 20 to 25 ft., but much shorter in secondary thickets. Sporadic, in mixed woods and thickets along the river Luxillo; in flower-bud Jan. 1857. No. **4609.**

Bumbo.—A tree of 15 ft., with broad lax crown; branches with hooked spines; flowers white-yellowish. At the base of Serra da

Xella above Bumbo, at Bruco; sparingly in fl. and with young fr. Oct. 1859. No. **4610**. A tree, 6 to 8 ft. high, with a very loose crown, vaguely and divaricately branched; flowers yellowish. At the margins of primitive woods between Bumbo and Serra da Xella; fl. Oct. 1859. No. **4611**.

Huilla.—An arborescent shrub, with quite patent branches. In wooded stony places near Mumpulla, at an elevation of 4000 ft., sparingly; fl. Oct. 1859. No. **4612**.

Cape de Verde Islands.—A small tree. In sandy and rocky maritime places near Porto Praza, in the island of St. Jago, frequent; without either fl. or fr. Jan. 1861. A small-leaved form. No. **4607**.

2. **Z. mucronatus** Willd. Enum. Pl. p. 251 (1809); Hemsl. in Oliv. Fl. Trop. Afr. i. p. 380 (*mucronata*).

Golungo Alto.—A tree of 15 to 20 ft. Road to Sobato de Bumba; without fl. or fr. April 1856. No. **6710**. Between Cambondo and the Luinha, June 1855. Berries reddish. Coll. Carp. 334.

Pungo Andongo.—A small tree, 8 ft. high. In wooded rocky places at the stream Canandua; without fl. or fr. April 1857. No. **4613**.

Huilla.—A much-branched tree, 20 ft. high; branchlets sarmentose-flexuose, rather nodding. In wooded stony places around Mumpulla, without fl. or fr., and near Lopollo with unripe fr. Dec. 1859, rather rare. No. **1266**.

2. **HELINUS** E. Mey.; Benth. & Hook. f. Gen. Pl. i. p. 385.

1. **H. ovatus** E. Mey. Zwei Pflanz. Doc. Drège, pp. 142, 144, 145, 190 (1843) (*ovata*); Hemsl. in Oliv. Fl. Trop. Afr. i. p. 384. *H. scandens* Radlk. in Abh. Nat. Ver. Bremen viii. p. 389 (1883), non A. Rich. *Gouania integrifolia* Lam. Encyl. Méth. iii. p. 5 (1789). *H. integrifolius* O. Kuntze, Rev. Gen. Pl. i. p. 120.

Golungo Alto.—A perennial herb or undershrub, with watery sap; flowers white or greenish; petals spreading at the time of flowering; anthers whitish; style-lobes included or exserted. Not uncommon, by thickets along the banks of the river Delamboa (also at the river Luinha and among the mountains in the district of Cazengo); with fl. and unripe fr. end of May 1856. No. **4614**. Near Trombeta, Cambondo and Sange, rarely in fl. May 1855; Zengas do Zenza, fl. and fr. Oct. 1855. No. **4614*b***. In grassy thickets near Sange; fr. August 1857. Coll. Carp. 335.

XL. AMPELIDEÆ.

The Ampelideæ take a prominent place among the manifold groups of plants which exercise more or less influence on the physiognomy of the vegetation in West Tropical Africa, and also become interesting to the phyto-geographer because the numerous species of *Cissus* and allied genera pretty clearly characterise, by their various habits and modes of life, the three great plant-regions into which Welwitsch divided the districts of Angola and Benguella. The number of species found by Welwitsch amounts to about forty, including two species of *Leea*; they range from the shores of the Atlantic Ocean up to the richly-wooded highlands of the interior, in a direction from west to east along a slanting

distance of about 300 miles towards the interior of the continent, increasing in the number of species and at the same time in the number of individuals. The distribution is such that the fleshy species principally inhabit the littoral region, the climbing species with glossy coriaceous leaves predominate in the mountainous region of the primitive forests, and the erect species affect the highlands of the interior; and this relation of the scandent species to the erect species is so marked that there were found in the mountainous region of primitive forest (1000—2400 ft. alt.), amongst about twenty species, only a very few erect species; while on the plateau of Huilla, which rises far above 5000 ft., though covered with forests and eminently adapted for climbing plants, there occurred, amongst eight species, only two scandent species. A humid atmosphere is favourable to the development of Ampelideæ, but principally of the scandent species; there occurred in the high mountainous tracts of the interior—as, for instance, in the sandy forests around Pungo Andongo and in the forests of Huilla, composed of species of *Protea* and *Parinarium*—chiefly erect species; such not having been seen at all in the littoral region, and very rarely in the high forest region. A considerable number of species do not at all occur in the jungles on the coast, but in rather dry sandy ground or on rocky cliffs, and two species even on the most arid burning Gneiss-rocks or in loose sands, as, for instance, *Cissus rubiginosa* and *C. jatrophoides*. In all parts of West Tropical Africa, where woods of Proteaceæ occurred, exclusively erect species were found (see Welwitsch, Sert. Angol., p. 30).

A second characteristic, which is represented in the geographical distribution of the species of *Cissus* and allied genera in Angola, is the pubescence and indumentum of the stems and leaves of these genera; while the species growing in the littoral region have mostly light-green and not very hairy stems and leaves, the species occurring in the region of the primitive forests are noted for their dark-green, glossy, more or less coriaceous, and frequently evergreen foliage, and nearly all the species of the highland region of the interior show always a more or less dense pubescence or even a tomentose indumentum on the stems and leaves, which, in *Cissus rubiginosa* Planch., a species occurring on the Gneiss-rocks of Pungo Andongo, is formed into so dense a gold-tawny shining velvet that the whole plant appears as if chiselled out of solid copper, and deserves to rank amongst the most beautiful plants of Angola.

C. jatrophoides, a species without tendrils, with a singular habit, and with brilliant scarlet flowers, is peculiar to the Ambaca district.

The Ampelideæ luxuriate with the greatest splendour in the primitive forests of Golungo Alto and Cazengo, but the greatest variety of forms is apparent in Pungo Andongo. A foremost rank must be assigned to this family as ornaments of the steppes, thickets, and forests, both to the scandent and to the erect species,

not only when flowering, but also and still more when laden with their ripe many-coloured grapes—green, violet, bluish, red, etc.

In Benguella the Ampelideæ are also represented rather abundantly, nine species occurring; but they influence the physiognomy of the vegetation but little or not at all, as the specimens of the respective species occur not only singly and never in quantity, but also because the more striking forms, such as *Cissus aralioides*, *C. andongensis*, *C. jatrophoides*, and especially the magnificent *Leea guineensis*, are here entirely absent.

Many species bear edible grapes in Angola, but their taste is not very agreeable; species with edible fruits occur also in Huilla, but they are far rarer than in Golungo Alto and Pungo Andongo. Some species, especially *Cissus pruriens*, bear fruits which taste tolerably good, but are covered with small hairy glands and excite in the mouth and throat after chewing them a long-continued burning and itching; the berries of this species are so much more dangerous to the traveller, as they are of a very beautiful dark purple colour, very juicy and good-tasted, and as the consequences of eating them are manifested only after a time. During the journey from Lopollo to the great lake of Ivantâla towards Quilengues, Welwitsch and several of his companions bitterly experienced the painful consequences of the enjoyment of this fruit, only too tempting in hot regions: all of them who had tasted the berries were afterwards attacked with a vehement burning of the throat, which lasted an hour.

The pulpy species and those with bottle-shaped stems are peculiar to the littoral region; those with tomentose stems are mostly found in the highland region.

The species which are most polymorphous are those with simple but lobed leaves, and it is often difficult to decide whether the leaves should be called simple or compound, as in different individuals of the same species the lobes are often split down to the apex of the petiole, and thus a 3- or 5-foliolate leaf is simulated. Much depends upon the circumstance whether the individual grows in the shade or in sunny places, amongst trees or shrubs or in the open steppes or in the forest; many climbers or creepers become in open ground nearly erect and do not form tendrils, and reversely; leaves on young and rather young individuals are often very different from those on the old and fruiting branches; even the stems frequently assume in old plants quite a different dress and form. On the other hand, the form of the calyx and corolla, as well as of the disk and glands, appears to remain very constant, but not in numerical relations, since tetramerous and pentamerous flowers frequently occur in the same individuals.

Species with 5-foliolate leaves often have at the extremities of the branches, both at the upper and lower parts of the plant, 3-foliolate leaves, There is a well-marked group, however, which has regularly trifoliolate leaves, as *Rhoicissus erythrodes* and some other species.

No species in Angola ever becomes a tree, not even a small tree,

except *Cissus macropus*, which is a dwarf tree occurring in Mossamedes, and except *Cissus Currori* Hook. f., a species from Elephants' Bay, which was gathered by Curror, and on his authority is described as a tree. But some species, as, for instance, *Rhoicissus erythrodes*, cover low trees; and *Cissus aralioides* and others cover high trees completely with their climbing branches, especially in the district of Huilla. The pliable stems of a few species are employed by the natives for tying up articles for transport. As ornamental plants, those with ferruginous foliage and those with quinquefoliolate various-coloured leaves might be advantageously introduced. *Leea tinctoria*, of the island of St. Thomas, is used by the natives to make a violet dye.

See a paper by Dr. Welwitsch, read before the Linnean Society of London, December 17, 1863, and published in the eighth volume of the Journal of that Society, pages 75-77, in 1864.

1. **VITIS** Tourn., L.; Benth. & Hook. f. Gen. Pl. i. p. 387 *pro parte.*

1. **V. vinifera** L. Sp. Pl. edit. 1, p. 202 (1753); Baker in Oliv. Fl. Trop. Afr. i. p. 400; Planch. Monogr. Ampelid. in DC. Mon. Phan. V. (ii.) p. 355 (1887).

Pungo Andongo.—Frequently cultivated in vineyards near the fortress at Caghuy in rocky and sandy situations; without fl. or fr. Jan. 1857. No. **1470**.

It is more rarely cultivated at Sange, in Golungo Alto, where it flowers and fruits in January, but rather frequently near the city of Benguella; in the district of Mossamedes the cultivation is successful; the white grapes are well flavoured, but are often thick-skinned and less aromatic than those grown in Portugal; black grapes were not seen. (See Welwitsch, Apontamentos, p. 553 under n. 111, and Sert. Angol. p. 9.)

2. **AMPELOCISSUS** Planch. in Journ. la Vigne Amér. (1884) p. 374. *Vitis* Benth. & Hook. f. Gen. Pl. i. p. 387 *pro parte.*

1. **A. urenæfolia** Planch. Monogr. Ampelid. p. 385.

Vitis Schimperiana Baker in Oliv. Fl. Trop. Afr. i. p. 395 *pro parte*; Ficalho, Pl. Uteis p. 121; non Hochst.

Pungo Andongo.—An undershrub or a shrub, 2½ to 6 ft. high, either erect or with erect-nodding or inclined or decumbent stems or sarmentose or more rarely scandent; root woody, very thick; stems numerous, cæspitose, purplish, rigid at least below; tendrils rare; flowers clustered, dark red; fruit ellipsoidal, as large as a moderate-sized olive, juicy, edible, sweetish but a little acid, at first red, then bluish-purple, when mature dark-purple or atrosanguineous. On the ascent to Pedra Cazella, in fr. 18 Dec. 1856; in grassy rocky thickets near Luxillo, rather rare, flower-bud Jan. 1857; in elevated bushy places, amongst the gigantic rocks at Pedra Cazella; fl. Feb. and fr. May 1857. Native name "Quixibua." No. **1456**. A sarmentose standard shrub, with apparently purplish flowers, sporadic; in sandy wooded situations near Luxillo; flower-bud 18 Oct. 1856. No. **1456***b*.

2. **A. leonensis** Planch. in Journ. la Vigne Amér., Jan. 1885, p. 30 ; Monogr. Ampelid. p. 387.
Vitis Leonensis Baker in Oliv. Fl. Trop. Afr. i. p. 398. *Cissus Leonensis* Hook. f. in Hook. Niger Fl. p. 264 (1849).

Sierra Leone.—A widely climbing shrub with reddish stem, numerous and extensive branches, and blood-red shining fruits. Frequent in wooded mountainous situations above Freetown ; with ripe fr. Sept. 1853. No. **1500**.

3. **A. salmonea** Planch. in Journ. la Vigne Amér., Jan. 1885, p. 31 ; Monogr. Ampelid. p. 395.
Vitis salmonea Baker in Oliv. Fl. Trop. Afr. i. p. 394.

Sierra Leone.—In wooded mountainous places above Freetown ; without either fl. or fr. Sept. 1853. No. **1498**.

4. **A. platanifolia** Planch. in Journ. la Vigne Amér., Feb. 1885, p. 47 ; Monogr. Ampelid. p. 397.
Vitis platanifolia Baker in Oliv. Fl. Trop. Afr. i. p. 398.

Huilla.—A shrubby herb or an undershrub, 2 to 4 ft. high or in poor ground scarcely 1½ ft. high, strictly erect and rigid, with numerous stems and without tendrils ; flowers reddish. In the open rather dry and sandy woods consisting of *Protea*, etc., between Lopollo and the river Monino, with young fl. Feb. 1860. No. **1447**. A suffruticose herb or an undershrub, 3 to 5 ft. high, erect or oblique, channelled, very tough, without tendrils ; leaves softly coriaceous, very bright-green above, ferruginous-hoary beneath ; flowers closely clustered, red ; fruit violet-red, obovoid-oblong, nearly glabrous, more than half an inch long, edible. In the thinner parts of the forest, between Lopollo and the river Monino, amongst small trees of *Protea*, *Eugenia*, *Dodonæa*, *Parinarium*, etc. ; fl. and young fr. (the latter not preserved) end of Dec. 1859. No. **1505**.

5. **A. heracleifolia** Planch. in Journ. la Vigne Amér., Feb. 1885, p. 48 ; Monogr. Ampelid. p. 397.
Vitis heracleifolia Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 398.

Pungo Andongo.—A climbing undershrub, sometimes standing erect ; stems numerous from a woody root-stock. In open woods, composed of Panda near the fortress ; sporadic ; fl. and flower-buds, 18 Oct. 1856. No. **1457**. An undershrub of 2 to 3 ft. and more, with reddish flower-buds. In sparingly grassy sandy places between the fortress and Luxillo, sporadic ; not yet in full fl. Oct. 1856. No. **1457***b*.
The same species occurs also at Caconda in the interior of Angola.

6. **A. dissecta** Planch. in Journ. la Vigne Amér., Feb. 1885, p. 48 ; Monogr. Ampelid. p. 398.
Vitis dissecta Baker in Oliv. Fl. Trop. Afr. i. p. 414.

Pungo Andongo.—An undershrub 3 to 5 ft. high ; stem sub-erect, firm, tough, striate, white-tomentose ; leaves compound, palmatipartite, white-tomentose beneath ; flower-buds purplish. Not common in wooded bushy places between Cazella and Luxillo ; not yet in full fl. Oct. 1856. No. **1459**.
Huilla.—An erect undershrub, 3 to 5 ft. high ; stems several ; cymes compact, small ; flowers reddish. In sandy-earthy woods composed of Panda, near the great lake of Ivantala ; scarcely in full fl.

Feb. 1860. No. **1444**. A sub-erect undershrub, 3 to 5 ft. high. In bushy places at the borders of woods near Catumba ; without either fl. or fr. Feb. 1860. No. **1445**.

Some of the leaves are digitately compound while others are simple and palmately lobed ; they show that this probably belongs to *A. heracleifolia* Planch., as regarded by Welwitsch and suggested by Baker.

7. **A. angolensis** Planch. in Journ. la Vigne Amér., Feb. 1885, p. 48 ; Monogr. Ampelid. p. 400.

Vitis angolensis Baker in Oliv. Fl. Trop. Afr. i. p. 410.

Cazengo.—A widely climbing herb, with very densely clustered blood-red flowers. In bushy places along the river Luinha near Aguas Doces, and in Serra de Muxaûla ; fl. Dec. 1854, fr. June 1855. No. **1488**.

Golungo Alto.—A widely climbing undershrub. Leaves 5-foliolate, herbaceous but rather fleshy ; flowers yellow-reddish. In high thickets in Serra de Alto Queta, sporadic ; fl. and fr. March 1856. No. **1467**.

The following No. may be a state of the same species ; it differs by having trifoliolate leaves :—

Pungo Andongo.—Herbaceous, widely scandent ; leaflets membranous, deep-green ; tendrils flowering. Sporadic, by dense thickets along the banks of the river Cuanza, near Candumba ; in young flower-bud Jan. 1857. No. **1462**.

8. **A. concinna** Planch. in Journ. la Vigne Amér., Feb. 1885, p. 48 ; Monogr. Ampelid. p. 400.

Vitis concinna Baker in Oliv. Fl. Trop. Afr. i. p. 413.

Loanda.—Rather rare at the borders of bushy woods composed of *Acacia*, at Mutollo, near Quicuxe ; fl. March 1854. No. **1491**.

9. **A. obtusata** Planch. in Journ. la Vigne Amér., Feb. 1855, p. 48 ; Monogr. Ampelid. p. 401.

Vitis obtusata Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 414.

Pungo Andongo.—A robust undershrub climbing far and widely ; stems angular, very tender ; leaflets 5, unequal, very obtuse, becoming rigid ; flowers dark-red ; young fruits red, a little juicy. In the more elevated thickets of the mountains of Pedras de Guinga, and less common on the rocks of the fortress of Pungo Andongo ; fl. and young fr. March and April 1857. No. **1461**. A subscandent undershrub, sometimes erect and nodding at the apex, or decumbent ; flowers red. In sandy-earthy thickets, at the borders of woods composed of Panda, near Luxillo, not far from the fortress, sporadic ; fl. Dec. 1856. No. **1504**.

10. **A. arcuata** Planch. in Journ. la Vigne Amér., Feb. 1885, p. 48 ; Monogr. Ampelid. p. 402.

Vitis arcuata Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 414.

Pungo Andongo.—An undershrub, almost a shrub, 4 to 6 ft. high ; stems at first straight, at length arching-deflexed ; branchlets and leaves secund. In wooded sandy-earthy thickets near Luxillo, in woods composed of Panda ; with badly developed fl. and young fr. April 1857. No. **1460**.

3. **RHOICISSUS** Planch. in DC. Monogr. Phan. v. (ii.) p. 463 (1887). *Vitis* Benth. & Hook. f. Gen. Pl. i. p. 387 *pro parte.*

1. **R. erythrodes** Planch. Monogr. Ampelid. p. 465.

Vitis erythrodes Fresen. in Mus. Senckenberg. ii. p. 284 (1837); Baker in Oliv. Fl. Trop. Afr. i. p. 401.

Pungo Andongo.—A low very much branched shrub, 3 to 4 ft. high; stems with scar-like pustular rugosities; tendrils puberulous; leaflets 3, unequal, more or less rhomboid, the lateral ones smaller and oblique at the base, deep green and rather glossy above, shortly ferruginous-tomentose beneath, thinly coriaceous; flowers whitish-yellow; calyx shortly cup-shaped, scarcely or somewhat toothed at the mouth; petals 5 or rarely 4, thick, very rigid, ovate, shortly and gradually acuminate, not cohering at the apex in a lid; filaments flattened at the base; disk flattened out, including the ovary, strictly radiate on the face; fruit 2-celled, glabrate, somewhat rugose, deeply 2- or 4-furrowed, 2- or 4-gibbous; cells 2-seeded. Common along thickets throughout the more elevated rocky parts of the fortified region of Pungo Andongo, near Caghuy; fl. Feb. 1857, fr. April 1857. No. **1464**. A widely scandent shrub or undershrub, 4 to 5 ft. high, with elongated flowering tendrils and closely clustered yellowish flowers. With No. 1464; fl. Feb. 1857. No. **1464***b*.

Var. *β.* **ferruginea** (Baker) Planch., *l.c.*, p. 466.

Pungo Andongo.—A pretty shrub, 3 to 4 ft. high, widely scandent. In hilly bushy places, near the banks of the river Cuanza in Sobato de Bumba, not far from the great waterfall, Cachoeira de Condo; fl. and fr. March 1857, in company with two species of *Protea*. A broad-leaved form. No. **1465**.

Huilla.—A robust, extensively climbing, intricately branched shrub, quite clothing low trees; trailing shoots hoary; younger leaves rufous-pubescent; flowers dusky-yellow; fruits when ripe brick-red, of the size and shape of those of *Juniperus Oxycedrus* L. Not uncommon in the lower woods and rocky thickets between Lopollo and Gambos, especially at Catumba; without fl. Feb. 1860; fl., and sparingly in fr. April 1860; fl. May 1860. No. **1455**.

4. **CISSUS** L. Diss. Dass. p. 6 (1747), Sp. Pl., edit. 1, p. 117 (1753). *Vitis* Benth. & Hook. f. Gen. Pl. i. p. 387 *pro parte.*

1. **C. palmatifida** Planchon Monogr. Ampelid. p. 473.

Vitis palmatifida Baker in Oliv. Fl. Trop. Afr. i. p. 397.

Pungo Andongo.—In the open rather deeply sandy parts of woods composed of Panda (*Pterocarpus erinaceus* Poir) near Luxillo; without either fl. or fr. Oct. 1856. No. **1458**.

This is probably what was said by Baker, *l.c.*, to be the above-mentioned species or to be a closely allied species; the leaves, however, are not densely matted on the lower surface, and the petioles are very short.

2. **C. morifolia** Planch. Monogr. Ampelid. p. 478.

Vitis pallida Baker in Oliv. Fl. Trop. Afr. i. p. 393 *pro parte*; non Wight & Arn.

Pungo Andongo.—A prostrate glaucescent herb, rather rigid, running a long distance above the ground or subscandent. In bushy dampish situations with tall herbage, along the banks of the river Cuanza, near Candumba; unripe fr. Jan. 1857. No. **1468**.

3. **C. suberosa** Planch. Monogr. Ampelid. p. 481.
Vitis suberosa Welw. ex Oliv. Fl. Trop. Afr. i. p. 392.

Pungo Andongo.—A robust scandent shrub, decking the loftiest trees with a very dense crown; when young simulating a *Begonia* with equal-sided leaves; the adult stem broadly corky-winged, very knotty at the base, in the young state with acute angles and green-purplish. In damp situations along streams, at the borders of the primitive forest of Mata de Pungo, within the lines of fortification, rather rare; Dec. 1856, fl. Feb. 1857. No. **1473.**

4. **C. nymphæifolia** Planch. Monogr. Ampelid. p. 484.
Vitis nymphæifolia Welw. ex Oliv. Fl. Trop. Afr. i. p. 393.

Huilla.—An ample firmly erect magnificent herb, 2½ to 4 ft. high, sparingly branched, without tendrils; stems and younger branches as well as the inflorescence and the young leaves especially beneath covered with a short ferruginous tomentum, the stems and adult leaves above becoming nearly glabrous; leaves simple, very ample, cordate-orbicular, sub-peltate, petiolate, very obtuse, erose-dentate, 7-nerved; flowers tetramerous, white-yellowish; calyx cup-shaped, shortly 4-lobed or 4-dentate; petals cohering at the base, parting at the apex, on the inside with a long hood and a deflexed appendage, attached together when falling; disk with 4 little horns or glands which receive the filaments in the middle of the sinuses and are emarginate-subtruncate at the apex; ovary immersed in the disk at the base, 2-celled, terminating in the thick conical style, stigma truncate-capitate. In wooded herbaceous places with tall grass; collected in a sally from Lopollo in the direction of Ohai; fl. Feb. 1860; near Catumba very sparingly with unripe fr. March 1860. No. **1448.**

The following No., without either flowers or fruits, somewhat resembles this species, but the indumentum is pale-tawny, not ferruginous; the foliage suggests that of the tree *Assonia huillensis*:—

Huilla.—An erect herb, 3 or 4 ft. high; stems several from the rootstock. In forests composed of *Parinarium*, *Syzygium*, *Protea*, etc., along the river Monino; Dec. 1859. No. **1450.**

5. **C. Livingstoniana** Welw. in Journ. Linn. Soc. viii. p. 76 (1864).
C. rubiginosa Planch. Monogr. Ampelid. p. 485. *Vitis rubiginosa* Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 394.

Golungo Alto.—Not uncommon in dense secondary thickets among tall herbage at the left bank of the river Cuango, between Sange and Camilungo; fl. and young fr. beginning of Jan. 1856. No. **1476.**

Pungo Andongo.—An elegant undershrub, 3 to 4 ft. high, covered in all parts with beautiful copper-red rather shining tomentum of variable thickness; stem erect; branches erect-patent; flowers yellowish. Growing in a cæspitose manner in dry rocky elevated parts of the stronghold of Pungo Andongo, at Pedra Cazella; fl. April 1857. No. **1466.**

6. **C. cæsia** Afzel. Rem. Guin. p. 55 (1815); Planch. Monogr. Ampelid. p. 485.
Vitis cæsia Baker in Oliv. Fl. Trop. Afr. i. p. 396 *pro parte.*

Sierra Leone.—Whole plant rather fleshy, glaucous-pruinose, rather rigid, brittle. In the more elevated woods above Freetown, on Sugar-loaf Mountain; with scarcely ripe fr. Sept. 1853. No. **1499.**

7. **C. farinosa** Planch. Monogr. Ampelid. p. 488.
Vitis farinosa Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 394.

Golungo Alto.—A weak rigid shrub, climbing to a great height ; stems glaucous-mealy ; leaves fleshy-coriaceous, rather glossy, turning paler and at length reddish-velvety beneath, blade occasionally 6 in. broad and 5½ in. long. In the elevated primitive woods of Cungulungulo and of Serra de Alto Queta near Zengas de Queta ; without fl. or fr. Feb. and August 1855. No. **1485**.

Cazengo.—Stem wholly farinaceous with a white powder, climbing, very tall ; flowers white, rather small. In the primitive coffee-woods near Cambondo and Dalatanda ; fl. and young fr. June 1855. No. **1489**.

8. **C. Welwitschii** Planch. Monogr. Ampelid. p. 489.
Vitis Welwitschii Baker in Oliv. Fl. Trop. Afr. i. p. 393.

Golungo Alto.—A tall climbing shrub, rather fleshy, apparently without tendrils ; stem juicy-fleshy ; leaves rather fleshy, coriaceous, bright green ; fruits when nearly ripe green-reddish, edible but little tasty. Rather rare in the primitive forests of Sobato de Quilombo Quiacatubia ; with nearly ripe fr. middle of July 1856. No. **1480**.

The following No., with subglabrous leaves nigro-punctulate on both surfaces and nearly entire margin, should be compared with this species and with *C. farinosa* Planch. :—

Golungo Alto.—Stem branched, glaucous-mealy ; leaves coriaceous, glaucous ; Quibôlo, without fl. or fr. July 1856. No. **1486**.

9. **C. Smithiana** Planch. Monogr. Ampelid. p. 490.
Vitis Smithiana Baker in Oliv. Fl. Trop. Afr. i. p. 390.

Golungo Alto.—Climbing far and widely ; leaves of a deep and bright green colour. In shady tall-bushy parts of the mountains of Serra de Alto Queta ; not yet in fl. Jan. 1856 ; in fl. Feb. 1856 ; Queta Central in unripe fr. April 1856. No. **1483**.

10. **C. diffusiflora** Planch. Monogr. Ampelid. p. 496.
Vitis diffusiflora Baker in Oliv. Fl. Trop. Afr. i. p. 390. *V. producta* Baker in Oliv. Fl. Trop. Afr. i. p. 389 *pro parte*, non *C. productus* Afzel. Rem. Guin. p. 63 (1815).

Sierra Leone.—A slender undershrub, climbing far and widely, smooth, with curious ramification, sometimes resembling a species of *Smilax* ; leaves thinly coriaceous, rather glossy, much paler on the lower surface ; stipules ovate, rather fleshy ; flowers white-reddish ; petals in most flowers free, but in some flowers on the same plant cohering at the apex. In the wooded thickets of Sugar-loaf Mountain above Freetown, at an elevation of about 1500 ft., adorning the region around the waterfall ; fl. Sept. 1853. No. **1501**.

11. **C. quadrangularis** L. Mant. (i.) p. 39 (1767) ; Planch. Monogr. Ampelid. p. 509.
Vitis quadrangularis Wall. List, n. 5992 (1831-32) ; Wight & Arn. Prodr. p. 125 (1834) ; Baker in Oliv. Fl. Trop. Afr. i. p. 399.

Loanda.—Primary joint of the stem cylindrical ; the succeeding joints all prismatic, with 4 wings, or scarcely winged but ferruginous-margined, undulate at the angles and there purplish, deeply furrowed on each side, constricted at the bends, fleshy-fibrous, long-lived ; the stem, the leaves, and especially the petioles rather rough and subpubescent with rather rigid whitish-hyaline hairs ; adult leaves broadly

cordate-ovate, shortly acuminate, distantly and sharply serrate, fleshy, soft; petiole acutely 4-angular, deeply channelled, 1½ in. long. In the winter or dry time (June to August) the stems denuded of leaves hang from branched trees after the manner of *Rhipsalis* or of *Cereus*; at the commencement of the spring-rains the plant reassumes the habit of *Cissus*. Peduncles obtusely quadrangular; pedicels terete; flowers pale-yellowish; calyx somewhat repand—4-dentate; petals 4, fleshy, rigid, reflexed at the time of flowering; stamens 4, erect, exceeding the firm style which is stigmatose at the apex; ripe fruit red, ovoid-globose, as large as a good-sized pea, 1-celled, 1-seeded; seed wrapped in mucilaginous membrane, erect, black, rather rough, rather large. Not uncommon in grassy fields and thickets, climbing on species of *Sterculia*, *Ficus*, and *Adansonia*; fl. near Penedo Feb. 1858, young fr. near Camutamba April 1858; common about the city of Loanda, fl. Jan. 1854. No. **1497**. Fr. March 1858. Coll. Carp. 338.

12. **C. aralioides** Planch. Monogr. Ampelid. p. 513.

Vitis aralioides Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 411. *V. constricta* Baker, *l.c.*, p. 409.

Golungo Alto.—A robust shrub, climbing extensively and to a great height, and then gracefully pendulous, the whole plant and especially the ample inflorescence resembling an *Aralia*; stem cylindrical, succulent but hard, jointed, violet-purple, densely scattered with small black rather raised points; petioles 2 to 4 in. long, somewhat furrowed; leaflets 5, all more or less broadly elliptic-lanceolate, unequal at the base, attenuate at both ends, distantly toothed, subglabrous, dark green and with a velvety-metallic gloss above, herbaceous-green beneath; teeth subulate, red; nerves more or less purplish; tendrils simple or bifid, spirally twisted, rather long, purplish; calyx very narrowly and shortly fringed on the margin; petals 4, red; stamens opposite to the deep erect thick rounded-obtuse yellowish channelled lobes of the disk; style elongated, capitate-stigmatose at the apex; fruit rather elongated, blue-purplish, edible, as big as a good-sized olive, 1-seeded. In damp dense primitive woods, climbing especially on *Khaya anthotheca* C.DC., and on species of Spondieæ, along the streams Cuango and Quiapoze; fl. April 1856, fr. June 1856, with foliage without fl. or fr. Jan. 1855. The most robust of all the species of vines seen by Welwitsch in Angola, nearly arborescent at the base; stem 2½ to 3 in. in diameter at the base, cylindrical-jointed as in *Rhipsalis*, somewhat furrowed on one side, nodose at the insertion of the branchlets leaves and tendrils. It is a remarkable ornament when in fruit to the trees on which it grows, and favours especially river-side trees; at Quiapoze, in fr. May 1855. No. **1484**.

13. **C. gracilis** Guill. & Perr. Fl. Seneg. p. 134 (1832); Planch. Monogr. Ampelid. p. 565.

C. membranacea Hook. f. in Hook. Niger Fl. p. 266 (1849). *Vitis gracilis* Baker in Oliv. Fl. Trop. Afr. i. p. 404 *pro parte*.

Ambriz.—In hilly exposed shortly bushy places between the mouth of the river Loge and Quizembo, sparingly; fr. Nov. 1853. No. **1494**.

Barra do Bengo.—In damp woods at the banks of the river Bengo near the convent of St. Antonio (several specimens accidentally sunk in the deep parts of the river); fr. Dec. 1853. No. **1496**.

Golungo Alto.—A herb, climbing high, with small green somewhat purplish flowers. In very shady primitive forests near the stream Delamboa; fl. Feb. 1856. No. **1477**. By the thickets in the more

elevated parts of the Sobato de Quilombo Quiacatubia, but sporadic only; fl. and fr. Feb. 1855. No. **1481.**

14. **C. debilis** Planch. Monogr. Ampelid. p. 569.

Vitis debilis Baker in Oliv. Fl. Trop. Afr. i. p. 403. *V. gracilis* Baker, *l.c.*, p. 404 *pro parte*; non Guill. & Perr.

Golungo Alto.—Among tall bushes at the borders of the primitive forests of Sobato de Quilombo-Quiacatubia, on the slopes facing the river Zenza; fl. and fr. Feb. 1855. No. **1478.**

Island of St. Thomas.—In the damp thickets of Monte Caffé; young fr. end of Dec. 1860. No. **1503.**

15. **C. stenoloba** Planch. Monogr. Ampelid. p. 578.

Vitis stenoloba Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 408.

Huilla.—A herb, 1 to 2½ ft. high; root thick; stems several, erect or somewhat oblique, straight, shaggy with very soft hairs mixed with red capitate glands, at length more or less glabrate, always reddish, rather rigid, longitudinally furrowed, swelling at the nodes; lower internodes 5 in. long, the upper ones gradually shorter, the uppermost ones about 1 in. long; leaflets subfalcate; transverse veinlets purple; petioles short or ranging up 1 in. or the upper ones obsolete; stipules scarious, reddening, ovate lanceolate or linear, subulate-acuminate, spreading, glabrous on the inner surface, somewhat glandular-pubescent on the outer surface. In sandy places in open woods between the large lake of Ivantala and Quilengues, rather rare; with few fl. and in ripe fr. Feb. 1860. No. **1449.**

The following No., without either flower or fruit, and badly represented in the British Museum set, appears to belong here:—

Huilla.—Stem ascending, branched from the base, deeply striate; stipules subcordate-ovate, very broad. In very shady woods composed of Leguminosæ, near the lake of Ivantala, Feb. 1860. No. **1451.**

16. **C. jatrophoides** Planch. Monogr. Ampelid. p. 579.

Vitis jatrophoides Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 400.

Ambaca.—A very beautiful succulent herb, 1 to 3 ft. high, in habit not badly simulating a *Jatropha*; root thick, fleshy, perennial, surrounded with fibres; stems cylindrical, erect, simple, bright rose-purple, tinged with a glaucous or glassy translucence, without tendrils, nodose at the joints; sap watery; leaves alternate, fleshy-succulent, rigid, trifoliolate, bistipulate at the base of the petiole, subglaucous-green; veinlets crowded, only coming into view after drying; inflorescence repeatedly dichotomous, but the primary division of the peduncle appears to be typically quinary, and usually 4 or only 3 corymb-bearing branches are found together with an intermediate sterile long-pedicelled solitary flower; peduncles 5 to 9 in. long; bracteoles small, lanceolate or ovate-lanceolate, sub-hyaline, two together at the base of the pedicels, occasionally at the middle of the pedicels; flowers bright orange-red, small, handsome; calyx shortly cup-shaped, somewhat or scarcely 4-toothed, persistent; petals 4, equal, concave, at the hooded-arched apex cohering in a lid, free at the time of flowering and then falling, inserted outside on the thick swelled 4-lobed hypogynous disk; stamens 4, inserted at the outer part of the base of the disk, opposite the petals, alternating with the lobes of the disk; filaments flattened, free, scarcely shorter than the petals; anthers 2-celled, dehiscing longitudinally, falling with the petals; ovary surrounded at the base by the 4-lobed disk, at first 2-celled; ovules 2

in each cell, ascending ; style at the time of flowering a little shorter than the stamens, soon after flowering rather elongated ; stigma obtuse, at the time of flowering parting at the apex by a very thin chink, after flowering bilobed ; lobes spreading horizontally ; fruit obovoid-oblong, greenish-purple, a little juicy, rather hard, 1-celled, 1-seeded ; seed erect, obovoid ; testa hard-crustaceous, whitish ; endopleura deeply induplicate with the albumen. In open clayey-sandy dry stony thickets, between the river Lutete and Zamba ; fl. and fr. 17 Oct. 1856. Abundant but seen only in one locality. No. **1474.**

The species occurs also in the interior of Angola at Caconda. The resemblance of the foliage to a branch of *Fucus serratus*, mentioned by Baker, holds in the case of badly dried specimens but scarcely in those of Welwitsch. It is the plant referred to by Welwitsch in Journ. Linn. Soc. viii. p. 75 (1864) as probably a new genus.

17. **C. macropus** Welw. in Journ. Linn. Soc. viii. p. 77 (1864) ; Planch. Monogr. Ampelid. p. 582.

Vitis macropus Hook. in Bot. Mag. t. 5479 (1864) ; Baker in Oliv. Fl. Trop. Afr. i. p. 405 ; Welw. Sert. Angol. p. 5.

Mossamedes,—A dwarf tree, 1 to 3 ft. high. In dry rocky mountainous (almost salt) parts of the district, especially on the sides of the mountains of Serra de Montes Negros near Mossamedes and in the interior parts of Giraûl towards the east, at an elevation of 400 to 600 ft. ; without fl. or fr. July (and Sept.) 1859 ; with flowers in cultivation in the Lumiar Garden at Lisbon May 1862. No. **1446.**

18. **C. adenocaulis** Steud. in Herb. Schimp. Abyss. sect. iii. n. 1702 ; A. Rich. Tent. Fl. Abyss. i. p. 111 (1847) ; Planch. Monogr. Ampelid. p. 586.

Vitis tenuicaulis Baker in Oliv. Fl. Trop. Afr. i. p. 404 *pro parte*. *V. adenocaulis* Miq. Ann .Mus. Bot. Lugd. Bat., i. p. 79 (1863-64) ; Baker, *l.c.*, p. 405.

Loanda.—A slender herb, much and cæspitosely branched, prostrate ; branchlets ascending-scandent, very slender ; leaves glossy-green, soft but rather fleshy ; leaflets obliquely unequal at the base ; flowers orange-yellow with a purplish tinge. Common by the lower thickets in the dry sterile sandy-stony parts of Praia de Zamba Grande ; fl. June, fr. July 1858. No. **1493.**

19. **C. chloroleuca** Planch. Monogr. Ampelid. p. 592.

Vitis chloroleuca Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 406.

Huilla.—A subscandent ornamental undershrub, 2 to 3 ft. high ; cymes bracteate ; flowers red : fruit ovoid-globose, tomentose, edible. Very rare, in wooded-mountainous rocky places from the great lake of Ivantala in the direction of Quilengues : fl. and fr. Feb. 1860. No. **1453.**

20. **C. andongensis** Planch. Monogr. Ampelid. p. 592.

Vitis andongensis Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 406.

Pungo Andongo.—An undershrub or a shrubby perennial herb, 2 to 3 ft. high ; stem zigzag, reddish, channelled-striate, sparingly or scarcely cirrhose. Leaves 5-foliolate ; leaflets oblong-lanceolate, the middle one shortly petiolulate, the two lateral ones sessile, unequally dentate, deep-green and nearly glabrous above, ferruginous-tomentose beneath ; petiole about 1 in. long ; stipules half-ovate, rather obtuse, red, persistent for a long time. Inflorescence shaggy-tomentose ; flowers pale-whitish-yellow ; calyx flattish but rather cup-shaped,

obscurely 4-dentate or nearly entire or very narrowly fimbriate-denticulate; petals 4 or rarely 5 (in the same cluster), broad, rather fleshy, cohering at the inflexed hooded apex, falling together; disk yellow, with 4 raised tubercles. Rare and sporadic, in rocky bushy places in the more elevated parts among the gigantic rocks on the western side of the fortified region of Pungo Andongo; fl. and young fr. Feb. 1857. No. **1463**.

21. **C. pendula** Planch. Monogr. Ampelid. p. 594.
Vitis pendula Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 407.

Pungo Andongo.—A low widely climbing perennial herb, from $1\frac{1}{2}$ to nearly 3 ft.; stem thick, juicy, fleshy, covered as well as the petioles and peduncles with blood-red glandular pilose hairs, viscid; leaves herbaceous-fleshy, not coriaceous, rather rigid, bright-green above, white- or whitish-tomentose beneath; flowers whitish or yellowish, reddening outside; fruit ovoid, blood-red, pendulous. In rocky thickets and stony bushy pastures and less abundantly on rocks, at Caghuy and in other parts of the fortified region of Pungo Andongo; fl. and fr. from Oct. 1856 to April 1857. No. **1472**.

22. **C. pruriens** Planch. Monogr. Ampelid. p. 595.
Vitis pruriens Welw. ex Baker in Oliv. Fl. Trop. Afr. i. p. 408.

Huilla.—An erect perennial herb, 2 to 3 ft. high, viscid-glandular throughout; hairs as well as the leaflets bright-green, terminating with red glands; stems several, sparingly branched; petals whitish at the base, blood-red from the middle to the apex; fruit when ripe $\frac{1}{2}$ in. in diam., bright red, with a pleasant acid-sweet taste, somewhat pendulous, covered with stinging hairs which after mastication afflict for hours the palate with a painful burning sensation. In wooded stony meadows near Lopollo, in the direction of Monino, sparingly; fl. and fr. middle of Dec. 1859. No. **1454**.

23. **C. Vogelii** Hook. f. in. Hook. Niger Fl. p. 267 (1849); Planch. Monogr. Ampelid. p. 596.
Vitis Vogelii Baker in Oliv. Fl. Trop. Afr. i. p. 409.

Golungo Alto.—Climbing to a considerable height; leaves membranous, with a velvety gloss; unripe fruit blood-red. In thickets at the base of the western mountains of Serra de Alto Queta, in the direction of Quibolo; fl. and unripe fr. March and June 1856. No. **1482**. An undershrub, climbing far and widely; fruit grape-shaped, black, as large as a good-sized pea, eaten by the negroes. Sange; fr. and seeds April 1855. Determination doubtful. Coll. Carp. 339.

24. **C. stipulacea** Planch. Monogr. Ampelid. p. 597.
Vitis stipulacea Baker in Oliv. Fl. Trop. Afr. i. p. 408.

Cazengo.—Inflorescence very viscid throughout; fruit ellipsoidal, of a vinous-red colour. In the more arid stony thickets amongst shrubs of *Strychnos*, at the left bank of the river Luinha, near Muxaûla; fl. and fr. Dec. 1854. No. **1490**.

Ambaca.—A widely climbing herb; leaves 5-foliolate, paler beneath; flowers red. Sporadic, in thickets at the borders of woods, between Zamba and the stream Lutete; without fl. or fr. Oct. 1856. No. **1475**.

Pungo Andongo.—In damp tall-grassy places between the fortress and Caghuy; fl. and young fr. March 1857. No. **1471**.

Planchon, *l.c.*, quotes Welwitsch No. 1450 for this species, probably by error for 1490

25. **C. Buchananii** Planch. Monogr. Ampelid. p. 601.

C. oppositifolia Welw. ms. ex Planch., *l.c.*, p. 602. *Vitis Thonningii* Baker in Oliv. Fl. Trop. Afr. i. p. 407, *pro parte*. *V. tenuicaulis* Baker, *l.c.*, p. 404, n. 47, *pro parte*.

Loanda.—A prostrate or climbing herb, rather fleshy throughout. Stem brittle at the nodes; leaves 5-3-foliolate, mostly alternate but occasionally in the middle of the stem opposite, deep green on both surfaces, somewhat pubescent, almost lepidote-pubescent, occasionally glandular; leaflets repand-dentate, all petiolulate; flowers yellow-reddish; cymes dichotomous; fruit densely ashy-tomentose, as large as a good-sized pea. On stony grassy slopes between Quicuxe and Mutollo; fl. and nearly ripe fr. April 1854. No. **1492***b*.

Barra do Bengo.—A prostrate very sarmentose herb, rarely subscandent on neighbouring shrubs; leaflets dark-green and glossy above, pale-green and with raised nerves beneath; flowers yellowish-red, scattered with little red glands; calyx unequally and almost obsoletely toothed; petals saccate-hooded at the apex, rather elongated, connivent into a pitcher which is manifestly constricted in the middle; stamens 4; disk rather thick, deeply 4-crenulate. Occasional in dry shrubby places, also in damp places from Quicuxe in the direction of Cacuaco; fl. July 1858. No. **1492**.

Golungo Alto.—Sporadic at the borders of primitive woods near Undelle; fl. Feb. 1856. No. **1479**. At the borders of primitive woods between Sange and Bango Aquitamba, sporadic; fl. and young fr. Jan. 1856. No. **1479***b*.

Pungo Andongo.—An herbaceous undershrub. Stem elongated, 4 to 6 ft. long, climbing, slender, pubescent, with tendrils; leaves some alternate, others in the middle of the stem opposite, 5-foliolate; leaflets nearly glabrous, deep-green on both surfaces, obovate-oblong, coarsely repand-dentate; petiole 1½ to 2 in. long; cymes axillary, on long peduncles, equalling the leaves, repeatedly 3-2-chotomously divided; the flowers as well as the stem, petioles and margins of the leaves beset with distant thickly-stalked glands. Rather rare, in rocky thickets between Caghuy and Calunda, by the road leading from Pungo Andongo towards Candumba, fl. Feb. 1857. No. **1469**.

Bumbo.—A bright-green, widely climbing herb, with slender stem and yellow-purplish flowers. In primitive forests along a stream in Serra da Xella; one specimen fl. Oct. 1859. No. **1452**.

26. **C. crassiuscula** Planch. Monogr. Ampelid. p. 608.

Vitis crassiuscula Baker in Oliv. Fl. Trop. Afr. i. p. 406.

Loanda.—A herb, branched at the base; branches dark-purple, glandular-viscid, prostrate; branchlets occasionally ascending and scandent; leaves 5-3-foliolate; leaflets rather thick and succulent, deep-green above, white-tomentellous beneath; flowers yellow-purplish; unripe fruit ovoid, tomentose. Sparingly in shortly bushy poor ground between Penedo and Conceição; fl. and young fr. end of June 1858. No. **1459**.

5. **LEEA** Royen L.; Benth. & Hook. f. Gen. Pl. i. p. 388.

1. **L. guineensis** G. Don, Gen. Syst. i. p. 712 (1831); C. B. Clarke in Journ. Bot. 1881, p. 166.

L. sambucina Schum. & Thonn. Guin. Pl. p. 134 (1827); Baker in Oliv. Fl. Trop. Afr. i. p. 415; non Willd.

Golungo Alto.—A handsome undershrub, 4 to 9 ft. high; leaves

tripinnate, 2 to 3 ft. long, widely sheathing at the base ; leaflets subcoriaceous, very glossy ; peduncles leaf-opposed ; flowers cymose-umbellate, orange-yellow or often bright scarlet, sometimes yellow or orange-red ; cymes 4 in. in diam. ; fruit of the size of a small cherry, compressed-hemispherical, dark-blue or purple, soft, marked outside with 6 vertical furrows indicating the 6 cells, filled with a liquid dark-violet pulp ; cells 1-seeded ; seeds ovoid-triangular, of a dark-chestnut colour. Common in primitive woods and in moist palm-groves throughout the district, especially by springs and streams ; fl. during nearly the whole year, fr. from July to Sept. 1856 ; Capopa and Zenza. No. **1487**. Cungulungulo, Feb. 1855, in company with *Hæmanthus*. No. **1487***b*. An undershrub, 3 to 5 ft. high ; in palm-groves near Sange ; seeds April 1855. Coll. Carp. 340. Near the river Cuango in palm-groves ; fr. July 1855. Coll. Carp. 341. By the Cuango in shade ; seeds Dec. 1855. Coll. Carp. 342.

2. **L. tinctoria** Lindl. (also Welw.) ex Baker in Oliv. Fl. Trop. Afr. i. p. 416 ; C. B. Clarke in Journ. Bot. 1881, p. 167 ; Ficalho, Pl. Uteis p. 123 (1884).

Island of St. Thomas.—A small sub-herbaceous tree or bush, 5 to 8 ft. high, rarely 10 ft. high, usually a shrub of 5 to 6 ft., very elegant, with the aspect of Meliaceæ ; stems somewhat plurisulcate, reddish ; leaves alternate, bipinnate ; leaflets broadly elliptical, with a long acumen at the apex, distantly dentate serrate with pointed teeth, glabrous ; peduncles opposite the leaves, much shorter than the petioles, much compressed, cymose-decompound, 2-3-chotomous, rufous-hairy above ; flowers from yellow turning to red or altogether bright red, rather large, ventricose-cylindrical in the bud, pedicellate ; pedicels longer than the calyx, $\frac{1}{6}$ in. long or rather longer, subangular in young fruit ; calyx glandular-tuberculate, campanulate, rather thick, 5-dentate ; teeth rigid, pointed ; petals 5, rather thick and rigid, fleshy, brittle when dry, oblong-linear, 2 or 3 times as long as the calyx, at length reflexed, cohering at the base and adnate to the staminal tube ; staminal tube cylindrically-pitcher-shaped, elongated, 5-cleft ; lobes erect, obtuse ; filaments 5, free, inserted at the base of the free part of the tube, flattened, turned inwards and antheriferous at the apex ; anthers cohering by their margins, included between the lobes at the inner part of the tube, opposite to the petals ; ovary glandular-tuberculate, 6-celled ; cells 1-ovuled ; style straight, cylindrical, as long as the staminal tube ; stigma depresso-capitate ; young fruit depresso-globose, thinly tuberculate, 6-celled, umbonate with the remains of the deciduous style. A valuable and beautiful violet-coloured dye is obtained from this plant and is employed by the natives. Native name "Celê celê." In wooded mountainous places, along streams, at Fazenda do Monte Caffé ; very sparingly fl. Dec. 1860. No. **1502**.

XLI. SAPINDACEÆ.

The Sapindaceæ principally frequent the mountainous region, where they are met with in the humid and shady woods of the mountainous districts, especially those of Quilombo, Quiacatubia, and Alto Queta ; they are very variable in habit, presenting themselves in some cases in the form of herbaceous or shrubby climbers, in others as trees more or less elevated and nearly always with shining and evergreen foliage ; some species of *Cardiospermum* infest as herbs only the standing crops ; the genera

Paullinia, *Aphania*, etc., appear quite at the banks of streams in the coast region; *Allophylus africanus*, *Bersama paullinioides*, as well as a new species of this genus and some other genera, inhabit the virgin woods of the mountainous region (Welw. Apont. p. 562, n. 147).

Some species of African Sapindaceæ are edible; a species of *Chytranthus* in the Island of St. Thomas is often called by the Portuguese colonists "Pecego" (peach); also certain species of *Aphania* produce edible fruits. The genus *Ptaeroxylon* (Sneezewood) is very remarkable on account of the wood exciting sneezing; it occurs not only at the boundary of the equinoctial circle, but even within 7° to 9° south latitude in the hilly or interior portion of the littoral region. Some affinity exists between Sapindaceæ and Euphorbiaceæ through the medium of the Euphorbiaceous genus *Hymenocardia*, the flowers and fruits of which remarkably resemble a species of *Dodonæa*, and even their structure is sufficiently similar, although the presence of albumen in *Hymenocardia* and the structure of the embryo easily prove an ordinal difference; moreover, *Oldfieldia* has been placed successively in the two Natural Orders.

1. **PAULLINIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 394.

1. **P. pinnata** L. Sp. Pl. edit. 1, p. 366 (1753) partly; Baker in Oliv. Fl. Trop. Afr. i. p. 419; Radlk. Monogr. Paull. p. 69 (1896).

Ambriz.—At the margins of woods near Lagõa da Banza de Ambriz, at an elevation of scarcely 150 ft.; fl. and fr. Nov. 1853. No. **1700**.

Golungo Alto.—Abundant at the borders of primitive forests from Calôlo as far as Cambondo; fl. August and Sept. 1855, fr. Sept. 1854. No. **1701**.

Bumbo.—A widely climbing shrub, with white flowers. In thin bushy woods along the banks of the Bumbo stream; fl. and fr. Oct. 1859. No. **1703**.

Var. **subherbacea**.

A widely climbing herb, almost wholly herbaceous or suffruticose; flowers white.

Barra do Bengo.—In bushy wooded places along the banks of the river Bengo near Quifandongo; fl. Dec. 1853. (Also near S. Antonio do Bengo.) No. **1702**.

2. **CARDIOSPERMUM** L.; Benth. & Hook. f. Gen. Pl. i. p. 393.

1. **C. grandiflorum** Sw. Nov. Gen. et Sp. Pl. p. 64 (1788); Radlk. in Sitz. Akad. Muench. viii. (1878) p. 260.

Var. **elegans**.

Golungo Alto.—Extensively climbing and almost entirely covering with their white flowers neighbouring shrubs. Common by thickets and at the margins of woods near Calôlo: fl. and fr. 17 Sept. and Oct. 1854. No. **1679**. An undershrub, climbing far and widely, stems subglabrous or sparingly and adpressedly villous; common by thickets throughout the district; near Sange fl. and fr. July and August 1856. No. **1681**.

Cazengo.—In the woods of Cambondo; fr. June 1855. No. **1681***b*.

Var. **hirsutum**; *C. barbicaule* Baker in Oliv. Fl. Trop. Afr. i. p. 418.

Golungo Alto.—A terrestrial herb, widely diffuse, beset with stinging hairs; at the margins of primitive woods between Cambondo and the stream Luinha; without fl. or fr. June 1855. A widely climbing undershrub; stem setose-pilose; flowers white; by secondary thickets on the lower slopes of the mountains of Serra de Alto Queta, near Carengue; fl. July 1855. No. **1680**. A very widely climbing undershrub; stem clothed with long and dense pilose hairs; flowers whitish; Carengue Queta, fr. August 1856. At Cacarambolo, in fl. June 1856. No. **6680**.

2. **C. Halicacabum** L. Sp. Pl. edit. 1, p. 366 (1753); Baker, *l.c.*, p. 417; Radlk. in Sitz. Akad. Muench. viii. (1878) p. 261.

C. microcarpum Kunth. in Humb. & Bonpl. Nov. Gen. v. p. 104 (1821); Baker, *l.c.*, p. 418.

Libongo and Barra do Bengo.—An annual, voluble-scandent, much-branched herb, with white flowers; in marshy sandy places at the banks of the river Lifune near Banza de Libongo, fl. and fr. Sept. 1858. Common in palm-groves at the banks of the river Bengo, near St. Antonio; fl. and fr. Dec. 1853 and Jan. 1854; also, but less frequently, near Quicuxe, where the var. *microcarpum* occurs more abundantly. No. **1683**.

Loanda.—By drying-up pools near Imbondeiro dos Lobos; fl. and fr. April 1854. (Var. *microcarpum*) No. **1684**. An annual herb, very extensively sarmentose-cæspitose, forming clumps 3 to 6 ft. high; flowers whitish; capsules of a dark chestnut colour. Occasional in muddy drying-up places, both cultivated and uncultivated, around Quicuxe; fl. and fr. June to August 1858. (Var. *microcarpum*) No. **1684***b*. In cultivated places near Loanda; seeds July 1854. Coll. Carp. 343. In fields near Quicuxe; fr. Oct. 1858. Coll. Carp. 344.

Zenza do Golungo.—In fields planted with cotton-plants near Calunguembo, sporadic; flower-bud Sept. 1857 (var.). No. **1685**.

Golungo Alto.—In fields planted with *Phaseolus*, near Sange, rather rare; scarcely in fl. April 1856 (var.). No. **1686**.

Pungo Andongo.—A decumbent or climbing little herb; fruit inflated-trigonous, depressed at the apex; angles membranous-winged. Near Catete, on rocks covered with a thin soil short grass and species of *Ophioglossum*; fl. and fr. 5 Jan. 1857. (Var. *microcarpum*) No. **1687***a*. In thickets at the base of Pedras de Guinga, before the existence of any cultivation; fl. and fr. March 1857. (Var. *microcarpum*) No. **1687***b*.

3. **C. Corindum** L. Sp. Pl. edit. 2, p. 526 (1762); Radlk. in Sitz. Akad. Muench. viii. (1878) p. 261.

C. canescens Wall. Pl. As. Rar. i. p. 14, t. 14 (1830); Baker in Oliv. Fl. Trop. Afr. i. p. 418.

Bumbo.—Rather rare, in neglected fields, behind Bumbo, at the base of Serra da Xella; with fr. and few fl. Oct. 1859. No. **1682**.

3. **ALLOPHYLUS** L. Fl. Zeyl. p 58 (1747), Sp. Pl. edit. 1, p. 348 (1753). *Schmidelia* L. (1767); Benth. & Hook. f. Gen. Pl. i. p. 396.

1. **A. africanus** P. Beauv. Fl. Oware, ii. p. 74, t. 107 (1807).

Schmidelia africana DC. Prodr. i. p. 610 (1824); Baker in Oliv. Fl. Trop. Afr. i. p. 421.

Pending a monographic treatment of the genus, I mention all of Welwitsch's specimens under this species; it appears to me impossible to keep *Schmidelia affinis* Guill. & Perr. distinct from it, and in other respects the arrangement of the genus in the Flora of Tropical Africa requires revision.

Golungo Alto.—A shrub of a man's height, dispersedly branched, with trifoliolate leaves confined to the apex of the branches, and white flowers. In the thickets of Undelle, in shady situations; fl. end of June 1855. No. **4508**. A shrub or sometimes almost a tree; branches twisted, nodulose, flexuous; leaves trifoliolate; leaflets membranous, smooth and glossy above; flowers white; calyx-segments 2 herbaceous and 2 petaloid, all concave; petals 4, woolly within; 2 glands thick, truncate, yellow. In the dense forests of Queta; young fl. Jan. 1856. No. **4509**. In the primitive forests of Sobato Quilombo-Quiacatubia; fl. end of Jan. 1856. No. **4510**. A slender shrub, sometimes subscandent with elongated sarmentose branches; flowers whitish; fruit juicy, scarlet. In the primitive forests of Quilombo, sporadic; fl. and fr. April and May 1856. No. **4511**. No notes. Fl. No. **6682**. The specimens from this district, as also No. 4512 from Pungo Andongo, approach *A. rubifolius* Engl. (*Schmidelia rubifolia* Hochst., Baker, *l.c.*, p. 423).

Cazengo.—A little tree or tall shrub, 8 to 10 ft. high, with spreading branches and reddish fruit. In dry situations at the skirts of the forests between Cabondo and Caculo; fr. June 1855. No. **4513**.

Pungo Andongo.—A shrub or small tree, with white flowers. In the denser forests of Mata de Pedra Cabondo, within the fortress; fl. April 1857. No. **4512**. A tall tree, 35 to 40 ft. high; branches lax and rambling; young fruit green, pea-shaped; sporadic, at the banks of the river Cuanza, between Candumba and Lombe; young fr. beginning of March 1857. No. **4514**. Mata de Pungo; flower-bud Dec. 1856. No. **4515**.

The following perhaps also belongs here:—

Golungo Alto.—A climbing shrub, with the habit of *Frangula* (Rhamnoid); flowers ashy-whitish; berries black, of the size and shape of a pepper-corn. Alto Queta; fr. Dec. 1855. Coll. Carp. 337.

4. **DEINBOLLIA** Schum.; Benth. & Hook. f. Gen. Pl. i. p. 405.

1. **D. cuneifolia** Baker in Oliv. Fl. Trop. Afr. i. p. 432.

Golungo Alto.—A shrub of 3 to 5 ft., or perhaps a young tree; leaves evergreen, paripinnate, coriaceous; petiole much thickened at its insertion. In the male flowers calyx-segments 5, broadly ovate, fleshy, concave, more or less ciliate at the margin, of unequal length, imbricate; petals 5, obovate, rather fleshy, white, inserted around the base of the thick disk, sessile, with their imbricate margins connivent in an urceolate manner around the bundle of filaments, fimbriate-ciliate on the margin especially toward the apex, alternating with the calyx-segments; stamens 15 to 20 (?) (16 in one case), inserted on the flat part of the torus and around the rudiments of the ovary, erect, subexserted: filaments somewhat flattened, whitish, beset with long rigid hairs directed upwards; anthers yellow, ovoid, 2-celled; cells longitudinally dehiscing; rudiment of the ovary consisting of conspicuously brown-hirsute styles. At the skirts of forests and of palm-groves, between Sange and Menha-Lula; male fl. 23 July 1855. No. **4524**.

The following five Nos. perhaps belong to the same species,

which in that case would probably be included in the type species of the genus, *D. pinnata* Schum. & Thonn. Guin. Pl. p. 242 (1827) not of Baker, *l.c.* :—

Ambriz.—At the lake Quibanza. Fruit scarlet. Name "Muene muene." No. **4525**.

Golungo Alto.—A low shrub; calyx rufous-tomentose; petals white. In thickets sprung up after cultivation, by the road leading to Menha Lula; fl. end of July 1855. No. **4527**. A shrub of 4 to 5 ft., with white flowers. In bushy places near the Cuango, rather rare; fl. July 1855. No. **4528**. A bush 4 to 7 ft. high, trunk erect at the base, more or less oblique above; leaflets rigidly coriaceous, variable in number; flowers white-yellowish (stamens 13 in one case); ripe fruit red. In thickets among the mountains of Queta; fl. middle of August 1856. No. **4529**. A tree-like shrub, 3 to 5 ft. high, erect, but little branched, evergreen; flowers polygamous (male and hermaphrodite); calyx-segments rounded-ovate, 4 or 5, ciliate on the margin, much imbricate: petals 4 or 5, longer than the calyx, whitish; ciliate, connivent, with a large scale within; stamens 16 to 20, strictly erect from the inside of the thick disk, very villous, almost hispid; anthers 2-celled, longitudinally dehiscent. In secondary thickets on the right bank of the Cuango, by the Ambaca road and near Sange; fl. and young fr. middle of Oct. 1855. No. **4530**.

The following No., with fruiting racemes and without foliage, should also be compared with this species:—

Zenza do Golungo.—In the forests of the mountains of Mongolo; fr. Sept. 1854. No. **4535**.

5. **APHANIA** Blume, Bijdr. p. 236 (1825). *Sapindus* Benth. & Hook. f. Gen. Pl. i. p. 404 *pro parte*.

1. **A. senegalensis** Radlk. in Sitzb. Akad. Muench. viii. (1878), p. 238.

Sapindus senegalensis Juss. (*t.* Radlk.) ex Poir. in Lam. Encycl. Méth. vi. p. 666 (1804) *excl. descript.*; Guill. & Perr. Fl. Senegamb. p. 117 (1831); De Less. Ic. Sel. Pl. iii. p. 22, t. 38 (1837); Baker in Oliv. Fl. Trop. Afr. i. p. 430. *Ornithrophe thyrsoides* Schum. & Thonn. Guin. Pl. p. 185 (1827). *Schmidelia thyrsoides* Baker, *l.c.*, p. 423.

Libongo.—A tree of 15 to 25 ft., or in secondary woods an arborescent shrub, evergreen, with a dense crown; leaves bifoliolate, chartaceous-rigid, glossy, bright green; flowers polygamous, yellowish. Abundant in wooded situations near the river Lifune, in the upper parts of the district; fl. end of Sept. 1858. No. **4532**.

Icolo e Bengo.—A tree of 20 ft., with a dense and broad crown and with the habit of *Mangifera indica* L.; leaves bifoliolate; flowers yellowish. Sparingly, in wooded places at the river Zenza, near Camutamba; fl. beginning of Sept. 1857. No. **4533**.

Zenza do Golungo.—A tree of 20 to 30 ft., with a very dense ovoid-spherical crown; leaves bifoliolate, coriaceous, glossy, bright green; flowers yellowish. At the margins of streams in wooded depressions between Tanderachique and Quicanda, at Quindjongo; fl. 4 Sept. 1857. No. **4534**.

2. **A. golungensis** Hiern, sp. n.

A shrub of 4 to 5 ft. with hard wood, becoming in the primitive

forests a little tree of 6 to 12 ft.; branches erect-patent, flexuous, terete, glabrate, leafy; leaves alternate, pari-pinnate, coriaceous, glossy, glabrate, 6 to 12 in. long, 1-4-jugate; common petiole 1 to 3 in. long; petiolules $\frac{1}{12}$ to $\frac{1}{6}$ in. long; leaflets narrowly elliptical, 2 to 6 by $\frac{2}{3}$ to $1\frac{2}{3}$ in., deciduous at the time of flowering; flowers diœcious, arranged on the branches in lateral simple or occasionally branched spikes of $\frac{3}{4}$ to $2\frac{1}{2}$ in., whitish, a little yellowish, $\frac{1}{6}$ to $\frac{1}{5}$ in. long. In the male flowers calyx-segments 4, valvate, tawny-tomentellous outside; petals 4 (the place of the fifth vacant), spathulate-obovate, each with two cleft appendages above the claw, glabrous except the subciliate sides, rather longer than the sepals; stamens 8 or 9, glabrous, subequal, exserted; disk unilateral, short, fleshy, glabrous; style bifid at the apex or undivided or wanting, glabrous, shorter than the filaments; ovary 0. In the female flowers staminodes 9 or 10, shorter than the stamens in the male flowers; ovary 3-lobed, 3-celled; ovules solitary; fruit carpels 3 or fewer, unequal, somewhat hairy, the largest ovoid, somewhat compressed, $\frac{1}{2}$ in. long, velvety-scarlet, edible, delicious.

Golungo Alto.—In bushy woods on the right-hand side of the Ambaca road, fl. Feb. 1856; Queta, fr. middle of Nov. 1855. No. **4516**. Queta, Ambaca road; male fl. Oct. 1855. No. **6681**. Without fl. or fr. No. **6681***b*.

6. **CHYTRANTHUS** Hook. f. in Benth. & Hook. f. Gen. Pl. i. p. 403.

1. **C. Mannii** Hook. f., *l.c.*, p. 404; Baker in Oliv. Fl. Trop. Afr. i. p. 430; Ficalho, Pl. Uteis p. 123 (1884).

Golungo Alto.—An erect tree, diœcious or polygamous, with a palm-like habit; leaves alternate, pinnate, large; flowers thyrsoid, in racemes spreading from the trunk near its base; calyx petals and filaments, as well as the petiole and the rachis of the whole inflorescence, beset with white more or less dense rather rigid pilose hairs, in the living state all these parts brilliantly rose-scarlet; calyx campanulate, somewhat gibbous, 5-cleft; petals inserted at the external base of the unilateral reniform disk, unguiculate; claw furnished at the apex with a bifid hairy ligule; stamens usually 7, the 5 shorter ones inserted between the disk and the rudimentary ovary, the 2 taller ones at the opposite margin of the ovary, the 2 taller ones exserted, the others subexserted; filaments pilose; anthers elliptical or more or less ovoid-elliptical, inserted at the emarginate base, 2-celled, longitudinally dehiscing; ovary rudimentary, hemispherical, sessile, composed of very dense rigid red hairs. Abundant in primitive forests at 2000 to 2300 ft. alt., near Sange, at Capopa; male fl. August 1855. No. **1690**.

Prince's Island.—A tree attaining 14 ft., but usually only 8 or 9 ft.; racemes simple or frequently paniculate, springing from the trunk a little above its base, nodding on all sides as well as the flowers clothed with rose-sanguineous or nearly scarlet velvety indumentum. Colonial name "Pecego" (peach). In wooded places, at elevation of 300 to 400 ft., in plantations of *Theobroma Cacao* L.; fl. Sept. 1853. No. **1689**.

Island of St. Thomas.—A tree, 10 to 15 ft. high; called "Pecegueiro" (peach-tree); in mountainous places, Monte Caffé; fl. Dec. 1860. No. **1688**.

7. **LECANIODISCUS** Planch.; Benth. & Hook. f. Gen. Pl. i. p. 402.

1. **L. cupanioides** Planch. ex Benth. in Hook. Niger Fl. p. 251 (1849).

Golungo Alto.—An elegant tree, 8 to 20 ft. high; trunk attaining 4 in. diam.; branches spreading; leaves crowded at the apex of the branches, impari-pinnate; flowers dicœcious; very sweetly fragrant, milk-white or almost white-bluish. Rachis of the long male racemes angular, channelled; calyx-segments imbricate at the flowering; petals 0; stamens 10 or 9 or 8 (or in the female flower 12, abortive); filaments filiform; anthers basifixed, introrse; disk thick, waxy, green-yellowish; ovary ovoid, hispid, rudimentary; style 0; stigma thick, capitate. In primitive forests at the banks of the stream Delamboa, not abundant; and by thickets in Sobato Mossengue, rare; male fl. end of March, ripe fr. beginning of Nov. 1855. Nos. **4632, 6683**. A moderate-sized tree. In forests on the right bank of the stream Delamboa; female fl. and young fr. June 1855. No. **6684**. A shrub of 6 ft. with an erect trunk or perhaps a young tree. Sporadic in little dense secondary woods at the base of Serra de Alto Queta; young fr. April 1855. Determination doubtful. No. **1274**.

8. **PHIALODISCUS** Radlk. in Sitz. Akad. Muench. ix. (1879), p. 497.

1. **P. plurijugatus** Radlk. in Sitz. Akad. Muench. xx. (1890), p. 263.

Golungo Alto.—A copiously leafy tree, 12 to 15 ft. high, with spreading branches. In very dense forests among the mountains of Serra de Alto Queta; without either fl. or fr. Feb. 1855. No. **4519**. In flower-bud. No. **4520**. Without either fl. or fr. No. **4522**. A tree, 25 to 30 ft. high; trunk 2 to 3 ft. in diameter at the base; branches spreading; crown ovoid; leaves bijugate. In the more elevated forests, mountains of Queta, Carengue; in flower-bud Sept. 1856. Native name, used in a collective sense, "Cachique." No. **6676**. A small tree; *Coffea melanocarpa* plantation, Caculo; capsule, beginning of Sept. 1855. Appears to belong to this species. Coll. Carp. 349.

Cazengo.—A tree of 8 to 12 ft.; trunk 3 to 4 ft. high; branches rather erect. At the borders of primitive forests near Cambondo and Caculo, sporadic; fr. Dec. 1854. No. **4521**. A tree, 8 to 10 ft. high; branchlets more or less nodose, twisted; flowers destroyed by insects. Near Caculo, by secondary wooded thickets, June 1855. No. **4523**.

2. **P. Welwitschii** Hiern, sp. n.

Branches woody, terete, glabrous, dull; branchlets dull grey-green, slightly puberulous towards the apex; leaves alternate, exstipulate, mostly pari-pinnate and 4-jugate, 8 to 14 in. long; petiole angular, subglabrate, 1 to $2\frac{1}{2}$ in. long; leaflets mostly opposite, more or less elliptic-oblong, obtusely acuminate at the apex, often unequally narrowed at the base, coriaceous, glabrous, entire or subentire, dark-green on both surfaces, $3\frac{1}{2}$ to 8 in. long by $1\frac{1}{2}$ to $2\frac{1}{2}$ in. broad; lateral veins in 7 to 12 pairs, in relief on the lower surface and impressed on the upper surface; petiolules $\frac{1}{5}$ to $\frac{1}{3}$ in. Male inflorescence in terminal paniculate spikes, about 4 in. long and broad, somewhat tawny-tomentellous; ultimate pedicels very short; bracteoles small, ovate; flowers hemispherical, $\frac{1}{8}$ to $\frac{1}{6}$ in. diam.; calyx deeply 5-lobed; lobes ovate, shortly tomen-

tellous outside, $\frac{1}{12}$ in. long; petals 4, trigonous-funnel-shaped, somewhat hairy on both surfaces, $\frac{1}{12}$ in. long; stamens 8, exserted, unequal, ranging up to $\frac{1}{5}$ in.; filaments slender, hairy except the apex, inserted within the fleshy annular somewhat hairy disk; ovary rudimentary, hairy, short, obtusely 3-sided.

Golungo Alto.—Without special locality or date. No. **4517**.

The two following Nos. may be mentioned here, but they apparently differ:—

Golungo Alto.—A tree, 12 ft. high; Queta Carengue; leaves (only) of a greener colour with more numerous lateral veins and with shorter petiolules. No. **6674**.

A leafy tree, apparently young, 12 to 15 ft. high; branches spreading; leaves paripinnate, coriaceous-papery, shining, with purplish nerves. In secondary woods near Quibixe; without fl. May 1856. A large-leaved plant, that should be compared with *Chytranthus Mannii* and *Deinbollia insignis* Hook. f. No. **4518**.

9. **DODONÆA** L.; Benth. & Hook. f. Gen. Pl. i. p. 410.

1. **D. viscosa** Jacq. Enum. Pl. Carib. p. 19 (1760); L. Mant. Pl. alt. p. 228 (1771); Baker in Oliv. Fl. Trop. Afr. i. p. 433; nec Mart.; nec Royen; nec Sieber.

Huilla.—A small tree, 10 to 15 ft. high, much branched, with a dilated rather lax crown; young leaves resinous-viscid; flowers yellowish-green. Sporadic, in mixed woods, between Lopollo and Monino; in male fl. Nov. and Dec. 1859. No. **1691**. A tree, 20 to 25 ft. high. Sporadic, in the mixed woods of Monino; fr. April 1860. No. **1692**.

10. **PTÆROXYLON** Eckl. & Zeyh.; Benth. & Hook. f. Gen. Pl. i. p. 411.

1. **P. utile** Eckl. & Zeyh. Enum. Pl. Afr. p. 54 (Dec. 1834).

Zenza do Golungo.—A bush, 6 to 12 ft. high; trunk straight-crown dilated, leafy; branches spreading; leaves membranous; chartaceous, green, pari-pinnate; leaflets 6 to 8, sub-pendulous; fruit capsular, flattened, obcordate, emarginate, dark-red, coriaceous-woody, 2-celled; cells 1-seeded; seed oblong, produced upwards into an obovate membranous rigid wing longer than the rest of the seed. Abundant, but seen only in one locality, in rocky hot bushy places from Quicanda to Camutamba, at elevation of about 1500 ft.; ripe fr. 5 Sept. 1857. No. **1693**. Coll. Carp. 346.

Huilla.—A shrub, 4 to 6 ft. high, or a little tree. In the bushy rocky parts of Ferrão da Sola, near Lopollo, at 5000 ft. alt.; ripe fr. May 1860. No. **1694**.

11. **BERSAMA** Fresen.; Benth. & Hook. f. Gen. Pl. i. p. 412.

1. **B. paullinioides** Baker in Oliv. Fl. Trop. Afr. i. p. 435.

Natalia paullinioides Planch. in Hook. Niger Fl. p. 252, t. 29 (1849).

Golungo Alto.—A very elegant copiously leafy tree, 15 to 35 ft. high, crowned at the apex; trunk 4 to 6 in. in diam. at the base; leaves opposite or alternate, evergreen, 4- to 7-jugate; common petiole much swollen at the base; rachis gradually winged towards the last pair of leaflets; leaflets thinly coriaceous, glossy, bright green on both

surfaces, apiculate with a short very acute acumen ; flowers cinereous-milk-white or pale-bluish, rather fleshy. Capsules arranged in erect racemes, velvety, deep-scarlet, the size of a small walnut, subspherical, girt at the base with the pentamerous remains of the calyx and corolla, mucronate at the apex with the hardened style, ribbed, 4-furrowed, coriaceous-woody, the younger ones deep-violet and as large as a hazel nut, 4- or very rarely 5-valved ; seeds scarlet except the orange cup-shaped aril at the base. In moist primitive forests among the mountains of Serra de Alto Queta, sporadic ; fl. June 1855 and August 1856, ripe fr. 8 Oct. 1855 ; primitive forest of Quisuculo, Sobato de Bango ; fl. Sept. 1855. No. **1695**. A tree ; capsule 4-valved, violet-scarlet ; seeds scarlet, arillate. Queta, June 1856. COLL. CARP. 345. A small tree, with leaves spread at the apex of the trunk in a palm-like manner ; flowers racemose-spicate ; calyx violaceous ; petals yellowish ; capsule woody, 4-seeded. Mata de Quisuculo ; fl. and fr. 8 Sept. 1855. COLL. CARP. 348. A small very elegant palm-like tree ; leaflets glossy, usually quite entire, but also on one and the same leaf occasionally remotely dentate-serrate. In the primitive forests of Serra de Alto Queta ; fl. 25 July 1856 and Quisuculo May 1856. No. **1696**. A tree of 12 ft ; trunk straight, as thick as a man's fore-arm ; branchlets nodose-scarred, erect, with leaves crowded at their apex ; leaflets in 5 or 6 pairs, softly coriaceous, entire or serrate-dentate, bright green and rather glossy above, pale-green and glossy beneath ; flowers yellowish ; calyx-segments 4, 3 equal, the 4th broader and shortly bifid ; petals ligulate-spathulate, rather hairy, yellowish-greenish ; stamens 4 ; style shorter than the stamens ; stigma ovoid-capitate vertically sub-costate, obtuse ; disk semicircular, 3-crenate, deep-red, opposite to the three equal calyx-segments. In primitive forests of the mountains of Serra de Queta Central, Zengas do Golungo ; fl. Sept. 1855. No. **1696*b***. No notes, without either fl. or fr. Determination quite doubtful. No. **6695**. A tree, 12 to 20 ft. high ; trunk slender ; head palm-like ; leaflets (21 in one case) not pellucid-punctate, but the younger ones very delicately pellucid-striate ; in the very shady primitive forests at the spring of Quibôlo near Sange ; without fl. or fr. March and June 1856. Determination also doubtful. No. **1699**.

2. **B. acutidens** Welw. ms. in Herb.

A shrub of 6 ft. or a small very elegant palm-like tree of 8 to 15 ft., erectly branched, glabrous except the inflorescence ; branchlets terete, shining ; leaves alternate, impari-pinnate, 1 to 2 ft. long, 2- to 6-jugate near the extremity of the trunk and branches ; common peduncle 3 to 4 in. long ; rachis often winged ; stipules ovate, $\frac{3}{8}$ in. long ; leaflets elliptical or oblong, somewhat narrowed, sometimes acutely acuminate and apiculate at the apex, unequal at the base except the cuneate terminal one, acutely or coarsely dentate or in the lower part nearly entire, thinly coriaceous, rather glossy, 2 to 8 in. long by 1 to 3 in. broad ; petiolule short ; racemes mostly axillary ; flowers of a pale sulphur colour, clove-scented ; gland various in shape, in some flowers almost like the residue of a blunt disk ; calyx-segments 4, one broader, bidentate at the apex. Entire and dentate or serrate leaflets occur on one and the same tree.

GOLUNGO ALTO.—In dense primitive forests at the cataract of Capopa, in Sobato de Bumba ; without fl. or fr. July 1855. No. **4536**. In dense primitive forests of Serra de Queta Central, flower-bud

10 July 1856 ; mountains of Queta Oriental, without fl. or fr. May 1856. No. **1697**.

The following is very doubtfully referred here :—

Golungo Alto.—A shrub, 4 to 6 ft. high ; leaves piperoid, with a long and acute acumen ; seeds black, with a scarlet aril ; Capopa, fr. June 1855. Coll. Carp. 347.

3. **B. andongensis** Hiern, sp. n.

A shrub of 5 ft. or perhaps the fresh shoot of a burnt tree, glabrous except the young part and inflorescence; branchlets leafy towards the apex, fistulose; leaves alternate, exstipulate, usually impari-pinnate, 5- to 10-jugate, 12 to 18 in. long ; common petiole $1\frac{1}{2}$ to 3 in. ; rachis slightly winged towards the apex ; leaflets ovate- or oblong-lanceolate, acuminate and apiculate at the apex, obtuse or unequally narrowed (or the terminal one wedge-shaped) at the base, nearly entire or along the upper part sharply toothed, thinly coriaceous, $2\frac{1}{2}$ to 5 in. long by $\frac{1}{2}$ to 2 in. broad ; inflorescence subterminal, spicate-thyrsoid, 3 to 6 in. long, more or less tawny-hairy, measuring together with the peduncle 9 to 12 in. long; pedicels ranging up to $\frac{1}{4}$ in. ; bracteoles linear, numerous, about $\frac{1}{8}$ in. long; sepals 4, imbricate, one of them bidentate at the apex; petals 5, reflexed; stamens 5, two of the filaments connate above the base for a short distance, the rest free ; fruit $\frac{1}{2}$ in. long.

Pungo Andongo.—In secondary thickets, near Luxillo, sporadic ; fl. and fr. Jan. 1857. No. **1698**.

XLII. ANACARDIACEÆ.

The Angolan species chiefly consist of several species of *Rhus* and *Calesiam* and of *Spondias* and its allies, one of which latter furnishes edible fruits resembling the Uva ferral, a black grape, in shape and colour, but not very well tasted ; a *Spondias* which also affords edible fruit is very common, both wild and cultivated ; the Cashew nut and the Mango are generally cultivated, but the latter is not much grown in the highlands.

1. **MANGIFERA** Burman ; Benth. & Hook. f. Gen. Pl. i. p. 420.

1. **M. indica** L. Sp. Pl. edit. 1, p. 200 (1753) ; Oliv. Fl. Trop. Afr. i. p. 442 ; Engler in DC. Monogr. Phanerog. iv. p. 198, t. iv. fig. 10-12 (1883).

Loanda.—With fully developed leaves, flowers and fruits, Dec. 1853, at S. Antonio do Bengo. No. **4432**. At Quifandongo, fl. Sept. 1854. No. **4434**. Cultivated by the river Bengo, fr. Feb. 1860 ; the seed (in the study set) measures $1\frac{2}{3}$ in. in length, $\frac{5}{6}$ in. in breadth, and $\frac{1}{3}$ in. in thickness. Coll. Carp. 357. Loanda ; seed, Jan. 1858. No. **4431***b*.

Icolo e Bengo.—A handsome tree ; head ovoid, very dense ; leaves coriaceous, rigid, glossy ; flowers yellowish ; fruit as large as a man's fist, orange-coloured outside as well as the very delicious pulp. Frequently cultivated by the river Bengo (Zenza), fl. Sept., fr. Dec. and June ; the skin of the root, which is very astringent and slightly aromatic, is occasionally used in the treatment of diarrhœa and dysentery ; at Camutamba, fl. Sept. 1857. No. **4433**.

Island of St. Thomas.—Not infrequently cultivated; with ripe fr. in Dec. and Jan.; with not quite ripe fr. and fl. Dec. 1860. No. **4431**.

The Mango (*Mangueira*) is generally cultivated in all the provinces of Angola, but it is not of much account in the highland region. (See Welwitsch, Apontamentos, pp. 564, 565.)

2. **ANACARDIUM** L.; Benth. & Hook. f. Gen. Pl. i. p. 420.

1. **A. occidentale** L. Sp. Pl. edit. 1, p. 383 (1753); Oliv., *l.c.*, p. 443; Engl., *l.c.*, p. 219.

Ambriz.—Between Ambriz and Mossul, probably spontaneous; fl. end of Nov. 1853. No. **4435**.

Loanda.—A tree 10 to 20 ft. high, generally branched almost from the base; trunk sometimes very oblique, decumbent; branches tortuous; flowers of a rose-flesh colour, frequently cultivated throughout nearly the whole district about country houses (Museque), thriving admirably in African soil; fl. Oct., Jan., Dec. 1853. No. **4436**. Frequently cultivated near Loanda, fl. Nov. to Feb. 1860. Coll. Carp. 358.

Pungo Andongo.—A tree of 10 to 20 ft.; fl. beginning of Dec. 1856. No. **4437**.

The Cajueiro, the Portuguese name of this plant, is frequently cultivated in almost all the districts of Angola, and its fine and very singular fruits abound at the proper season in the markets of the coast from Ambriz to Benguella. The gum, which exudes in great quantity from the trunks, and which in India and other countries is utilised for varnishes, is not considered as an article of commerce, although it can be collected in great abundance in Angola, and is of excellent quality.

The nut (from Loanda), of which the fleshy pedicel (hypocarp) properly forms what is called the fruit, contains a very tasty kernel, and is for that reason in much demand; but since the pericarp abounds in a very caustic liquid resin, it is necessary to avoid swallowing with them any particle of the pericarp; the latter immediately produces burning pains in the mouth and œsophagus. (See Welwitsch, Synopse, pp. 50, 51, nn. 135, 136.)

3. **SPONDIAS** L.; Benth. & Hook. f. Gen. Pl. i. p. 426 (partly).

1. **S. Mombin** L. Sp. Pl. edit. 1, p. 371 (1753).

S. lutea L. Sp. Pl. edit. 2, p. 613 (1762); Engl., *l.c.*, p. 244; Oliv. Fl. Trop. Afr. i. p. 448.

Loanda.—Cultivated in the city of Loanda, having been introduced from the banks of the rivers Bengo and Dande; fl. Dec. 1857. No. **4443**.

Zenza do Golungo.—A tree ranging from 20 to 40 ft. in height, taller and less leafy in forests, and shorter but with a dilated finely leafy head in open plains; fruit as large as a very full-sized olive, bluntly ellipsoidal, of a shining golden colour, very agreeable with an acidulous-sweet taste, less acid than those observed in Sierra Leone; in rather moist wooded stations throughout the whole province of Angola; usually fl. and fr. on the same tree from Sept. to May; in fl. Sept. 1857, Camutamba; native name "Muguenga." No. **4442**.

Ambaca.—A tree 50 ft. high, with a dilated crown, and laden with fl. and nearly ripe fr. at the same time; near Ngombe middle of Oct. 1856. No. **4444**.

Golungo Alto.—Trombeta, Feb. 1856. Native name "Muguengue." Endocarp of fruit fibrous outside, 1 in. long, ¾ in. broad, ⅔ in. thick, with small cells. Coll. Carp. 360. A tree, 20 to 25 ft. high, with a handsome head; flowers (hermaphrodite) white; fruit shaped like a cherry, sweet-acidulous, of a bright yellow-orange colour; spontaneous and cultivated. Coll. Carp. 361.

Pungo Andongo.—By native villages frequently cultivated near Pungo Andongo, and wild in Ambaca. Coll. Carp. 359.

See Welwitsch, Synopse, p. 13, n. 28, Apontamentos, p. 565.

The two following Nos., one represented in the British Museum set by imperfect foliage and a young fruit, and the other by leafy branches only, may perhaps belong to this species:—

Golungo Alto.—A tree, 80 ft. high; in the midst of the forest near Cungulungulo, Feb. 1855; native name "Muguenga." No. **4445**. A young tree (?), 3 ft. high; Zengas de Queta, May 1856. No. **6673**.

Four out of the five references, which Linnæus quotes for this, the only species, of *Spondias* in Sp. Pl. edit. 1, belong to the *S. lutea* of the second edition.

4. **SCLEROCARYA** Hochst.; Benth. & Hook. f. Gen. Pl. i. p. 427.

1. **S. caffra** Sonder in Linnæa xxiii. p. 26 (1850) (*Sclerocarpa*); Oliv. Fl. Trop. Afr. i. p. 449; Engl., *l.c.*, p. 257.

Bumbo.—Gongo; fl. and young fr. Oct. 1859. No. **4441**.

This species is truly said by its author to be nearly related to *S. Birrea* Hochst., with which indeed Welwitsch's specimens very nearly agree. In Bumbo it affords an intoxicating drink.

5. **PSEUDOSPONDIAS** Engler in DC. Monogr. Phanerog. iv. p. 258 (1883).

1. **P. microcarpa** Engl., *l.c.*, p. 259, t. viii. fig. 1-6.

Spondias microcarpa A. Rich. in Guill. & Perr. Fl. Senegamb. Tent. p. 151, t. 40 (1832); Oliv. Fl. Trop. Afr. i. p. 448.

Golungo Alto.—A vast tree, attaining 120 ft. in height and more, producing fruit twice annually, in March and Sept.; fruit like a small plum, of a deep-blue colour outside when ripe, greedily eaten by the natives; at the banks of the Quiapose, 4 June 1855. Native name "Páo Musondo." No. **4453**. Abundant both in primitive and secondary woods; at Sange, in fl. June 1855. No. **4454**. A lofty tree, with a straight trunk 2 to 2½ ft. in diam., 40 to 70 ft. high; head broad; branches spreading, sometimes quite patent; leaflets hard-coriaceous, rather shining, a little paler on the lower surface; flowers white; calyx small, yellowish-white, deeply 4-lobed; segments obovate-elliptical, concave, equal; petals 4, inserted beneath a rather thick orbicular obtusely 8-crenate disk, much longer than the calyx-segments, wide at the base, sessile, ovate-elliptical, imbricate in æstivation, of a pale-sulphur colour; stamens 8, inserted below the disk, shorter than the corolla; filaments a little flattened at the base, filiform, subulate-acuminate at the apex; anthers cordate, introrse, 2-celled, longitudinally dehiscing; styles 3 or 4, short, thick, obtuse, connivent upwards, almost agglutinated together, stigmatose at the very obtuse apex; drupe juicy, of a fine blue colour outside, of the shape and size of an olive, without either spines or tubercles. Abundant in primitive forests throughout the district; Sobato Mussengue, in fl. in the middle of Feb. 1856, at Cungulungulo, in fr. at the beginning of Feb. 1855. Native name "Musondo." No. **4455**. In flower. No. **4456**.

One of the most majestic trees of the interior of Angola. The fruit is appreciated by the natives ; it imitates the shape and colour of the black grape of Portugal, although it is inferior in taste. On no occasion did Welwitsch notice any application of the timber either on the part of the natives or on that of the Portuguese colonists. (See Welwitsch, Synopse, p. 14, n. 32, and Apontamentos, p. 565.)

Loranthus angolensis Engl. is parasitical on this tree ; Welw. No. 4844. *Opilia amentacea* Roxb. climbs upon Musondo in Pungo Andongo. (See Welw. No. 470.)

6. **CALESIAM** Adans. Fam. Pl. ii. p. 446 (1763); O. Kuntze, Rev. Gen. Pl. i. p. 151 (1891) (*Calesium*). *Odina* Roxb. ; Benth. & Hook. f. Gen. Pl. i. p. 423.

1. **C. rubra** Hiern, sp. n.

Shrubby, apparently dwarf; young parts and foliage softly tawny-velvety, with stellate tomentum, the older branches obsoletely so ; leaves normally impari-pinnate, attaining nearly a foot in length, including a petiole of 2 to 3 in. (perhaps not fully developed in our specimens) ; leaflets in 4 to 6 pairs besides the terminal one, above dark-green when young, afterwards yellowish-green, paler beneath, opposite or nearly so, linear-oblong or somewhat lanceolate, rather obtusely narrowed sub-acuminate at the apex, unequal and often decurrent at the sessile base, coriaceous, 2 to 3 in. long by $\frac{1}{3}$ to $\frac{2}{3}$ in. wide ; lateral veins 6 to 8 on each side of the midrib ; inflorescence lateral (or axillary), appearing before the full development of the young leaves, crowded in racemose panicles 1 to $2\frac{1}{2}$ in. long, more or less pubescent with stellate tawny hairs ; flowers polygamous, blood-red, sessile or very shortly pedicelled, small, tetramerous ; bracteoles small ; calyx glabrate ; lobes rounded, ciliolate ; petals oval or oblong, glabrous, obtuse, imbricate in the bud ; stamens 8, longer than the calyx and shorter than the petals ; anthers short ; ovary shortly ovoid ; styles 4, in the hermaphrodite flowers lateral at the top of the ovary ; drupe red, ovoid, glabrescent, more or less oblique, somewhat compressed, often crowned with the remains of the 4 styles, $\frac{1}{2}$ in. long, usually 1-celled ; seed pendulous.

Huilla.—In rather dry bushy pastures, between Mumpulla and Nene ; fl. Oct. 1859. No. **4439**. In similar stations near Lopollo, but not abundant ; fr. Jan. 1860. No. **4440**.

2. **C. ambacensis** Hiern, sp. n.

A shrub, 1 to 3 ft. high ; rootstock thick hard-woody, sending up 1 to 3 erect stems ; herbaceous above, young parts and foliage softly tawny-velvety with stellate tomentum, the older parts obsoletely so ; leaves impari-pinnate, attaining 8 in. in length including a petiole of 2 in. ; leaflets in 2 or 3 pairs besides the terminal one, oval or rather obovate, above dark green and becoming nearly free from tomentum, pallid-tawny beneath, opposite or nearly so, very obtuse retuse or abruptly sub-apiculate at apex, unequal at the sessile or subsessile base ; lateral veins about 8 on each side of the midrib, the terminal one often shortly

stalked, coriaceous, 2 to $3\frac{1}{2}$ in. long by $1\frac{1}{4}$ to 2 in. wide; inflorescence usually before the development of the leaves, emerging as if immediately from the ground, near or a little above the base of the stems, in thyrsoid panicles, $1\frac{1}{2}$ to 2 in. long, sparingly stellate-hairy or nearly glabrous; pedicels short, ranging up to about $\frac{1}{8}$ in. long; flowers small, blood-red or reddish, hemispherical, $\frac{1}{8}$ in. in diam., glabrate, tetramerous; calyx about half as long as the corolla, with rather deep ovate obtuse or apiculate lobes; petals imbricate in æstivation; drupes ovoid, slightly compressed, $\frac{2}{5}$ in. long, $\frac{1}{3}$ in. broad, $\frac{1}{5}$ in. thick, tipped with the remains of the 3 styles, glabrate, juicy, blood-red, more or less unequal at the base, 1-celled, 1-seeded; seed pendulous.

Ambaca.—Not uncommon in bushy plains about Ngombe, especially in pastures near the river Panda; fl. and young fr. middle of Oct. 1856. No. **4438**. Coll. Carp. 350.

3. **C. antiscorbutica** Hiern, sp. n.

Odina acida Ficalho, Pl. Ut. p. 126 (1884); non A. Rich.

A tree, 15 to 25 ft. high, usually about 20 ft.; trunk erect, resinous; branches glabrous; leaves impari-pinnate, glabrous or nearly so, usually about a foot long including a petiole of 2 to 4 in., occasionally growing longer at the apex; leaflets in 3 or 2 pairs (or occasionally 4 or 5) with a terminal petiolate one, unequally oval or somewhat ovate, shortly acuminate (in the adult form) at the apex, unequally rounded or obtuse at the base, $2\frac{1}{2}$ to 5 in. long by $1\frac{3}{4}$ to $2\frac{1}{2}$ in. wide (occasionally ranging to 7 in. long); lateral veins usually 8 to 10 on each side of the midrib; sometimes a few stellate hairs appear in the axils of the lateral veins beneath; petiolules ranging up to $\frac{1}{8}$ in. long (occasionally up to $\frac{1}{4}$ in.); inflorescence appearing before or without the leaves, in crowded thyrsoid lateral panicles 1 to 2 in. long; branches ferruginous with short stellate hairs; flowers sessile or very shortly pedicellate, hermaphrodite, yellow-greenish, glabrous except the base, $\frac{1}{8}$ in. long; calyx deeply divided into 4 obtuse ovate segments, fleshy at the base, persistent, about one-third as long as the corolla; petals 4, lanceolate-lingulate, obtuse, imbricate in æstivation; stamens 8, glabrous, anthers shortly oblong; disk furrowed; ovary thick, glabrous, oblong-conical, soon becoming ellipsoidal-clavate, with 4 divaricate short cylindrical glabrous obtuse styles about the top, which as the drupe ripens form 4 short horns about the apex of the fruit; fruit irregularly ovoid, $\frac{3}{8}$ in. long, $\frac{1}{4}$ in. broad. $\frac{1}{8}$ in. thick (in the dry state); 1-celled, 1-seeded; seed pendulous, exalbuminous; testa membranous; embryo slightly curved, cotyledons rather flat, a little curved, radicle short.

Ambriz.—Bridge of Ambriz; generally used for scurvy; strikes root and starts growing quickly. Native name "Páo Emcumbi." No. **4450**.

Golungo Alto.—Abundant by the native villages, also cultivated near dwellings; fl. and young fr., but without foliage, August 1855. Native name "Páo Mucumbe." No. **4447**. A tree, at the skirts of

woods and in bushy situations near streams; fr. and with young foliage Dec. 1855. Bark officinal. Native name "Mucumbi." No. **4448**. A small tree; in thickets near Sange; fr. and foliage, but without fl., June 1855. Native name "Páo Mucumbi." No. **4449**. Near Sensala Cangunho, with young foliage, 30 Sept., 1855. Native name "Páo Mucumbi." No. **4451**.

The next following No. has immature foliage without flowers or fruit, and also bears the native name "Páo Mucumbi"; but it differs from the rest by longer (16 in.) 5-6-jugate foliage and leaflets ranging up to 7 in. long by $3\frac{1}{4}$ in. wide:—

Golungo Alto.—A small tree, 15 ft. high, resembling in habit a species of *Spondias*; wood white, tough, usually employed by the negroes for the construction of their dwellings; plants multiplied with the greatest ease; occurs everywhere by native villages, and in rather moist forests; Sange, July 1855. No. **4452**.

Mucumbi-bark is the product of a tree of moderate height, with the habit of an ash-tree, a native of virgin forests in the hilly districts of Angola; this tree is also met with cultivated in the vicinity of the villages of the natives, who employ a decoction of its bark as a remedy for scorbutic ulcers of the mouth and other troubles caused by scurvy. (See Welwitsch, Synopse, p. 30, n. 72.)

A species of *Loranthus*, Welw. Herb. No. 4846, grows as a parasite upon Mucumbi.

4. **C. Welwitschii** Hiern, sp. n.

A tree, 25 to 50 ft. high, with a broad leafy head; trunk straight, bare below, glabrous except the very young parts the base of the petioles and the diœcious inflorescence; branches erect-patent, leafy at the apex; leaves usually trijugate and impari-pinnate, occasionally pari-pinnate by abortion or bijugate, 12 to 20 in. long (including a petiole of 3 to 5 in.); leaflets elliptical, narrowly and mostly abruptly sub-obtusely long-acuminate at the apex, more or less narrowed at the base, rigidly membranous, entire (or somewhat sinuous or undulate), glabrate, obscurely herbaceous-green and without gloss above, paler and rather glossy beneath, with 7 to 10 slender lateral veins on each side of the midrib, the lateral leaflets 3 to $7\frac{1}{4}$ in. long by $1\frac{1}{2}$ to $2\frac{1}{2}$ in. broad on petiolule of $\frac{1}{8}$ to $\frac{1}{3}$ in. long, the terminal leaflet 4 to $6\frac{3}{4}$ in. long by $1\frac{3}{4}$ to $3\frac{1}{2}$ in. broad on petiolule of $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long. Male inflorescence more or less scattered with small stellate or subsquamous deciduous ferruginous hairs, in the upper axils or lateral near the apex of the branches, 8 to 11 in. long, branched in a pyramidal manner; peduncles and primary pedicels flat-dilated, furrowed, yellowish; ultimate pedicels thyrsoid, about as long as the flowers; flowers glabrate, yellowish, about $\frac{1}{10}$ in. long; calyx small, 4-cleft half way down; lobes ovate, rounded; petals 4, ovate, obtuse, twice as long as the calyx, imbricate in æstivation, alternate with the calyx-lobes, patently inflexed during full-flowering; stamens 8 (occasionally by abortion 6 or 7), inserted with the petals at the outer base of the octagonal disk, opposite to the 4 calyx-lobes and to the 4 petals, longer than the petals (according to Welwitsch); filaments flattened at the base, and

thence gradually filiform ; anthers cordate-oblong, introrse, 2-celled, longitudinally dehiscing ; styles apparently 4, cohering, more or less truncate at the apex ; stigmas sessile, oblong, slender, arranged in a radiating manner. Female inflorescence, like the male but smaller, 2 to 4 in. long, and with very short ultimate pedicels ; young fruit $\frac{1}{3}$ in. long, $\frac{1}{6}$ in. broad, somewhat compressed, glabrous, not or scarcely marked by any remains of styles at the apex, based with the small persistent calyx, 1-celled.

Golungo Alto.—In the primitive forests of Quibanga and at the banks of the river Delâmboa ; a tree of 30 to 50 ft. ; male fl. at the latter station, 24 Jan. 1856. No. **4543**. Rather rare in the primitive forests of Mata de Quibanga of Sobato Mussengue ; a tree of 25 to 30 ft. ; with young fr. Dec. 1855. No. **4542**.

Nearly related to *C. Wodier* (*Calesium Wodier* O. Kuntze) ; and apparently to *C. Stuhlmannii*, that is, *Odina Stuhlmannii* Engl. Pflanz. Ost-Afrik. Part C, p. 244 (1895).

7. **SORINDEIA** P. Thouars ; Benth. & Hook. f. Gen. Pl. i. p. 419.

1. **S. acutifolia** Engl. Bot. Jahrb. xi., Beiblatt No. 26, p. 6 (1890).

Island of St. Thomas.—A large timber-tree ; local name "Gogó vermelho" or "Gogó." Leafy branch, without fl. or fr. No. **6753**.

This determination is very doubtful ; it was suggested by the local name Gogo, which belongs to the species, according to Henriques in Bol. Soc. Brot. x. p. 110.

8. **SCHINUS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 422.

1. **S. molle** L. ! Sp. Pl. edit. 1, p. 388 (1753) ; Engler in DC. Monogr. Phanerog. iv. p. 333 (1883).

Var. *β.* **Areira** DC. Prodr. ii. p. 74 (1825) ; Engler, *l.c.*

S. Areira L. ! Sp. Pl. edit. 1, p. 389 (1753).

Cape de Verde Islands.—A bush, 15 ft. high ; cultivated in damp valleys of the island of Sant Iago ; Jan. 1861. A leaf only in the British Museum set. No. **4446**.

9. **HEERIA** Meisn. Plant. Vascul. Gen. i. p. 75 (1837), ii. pp. 55, 349 ; non Schlecht. (1839). *Anaphrenium* E. Mey. ex Endl. Gen. Plant. p. 1134 sub n. 5924, ex Arnott in Hook. Journ. Bot. iii. p. 148 (Dec. 1840) (*Anafrenium*) ; Engler in DC. Monogr. Phanerog. iv. p. 355 (1883). *Rhus* Benth. & Hook. f. Gen. Pl. i. p. 418, *pro parte.*

1. **H. insignis** O. Kuntze, Revis. Gen. Pl. i. p. 152 (1891) ; Engler. Pflanz. Ost-Afrik., Part C, p. 245 (1895).

Anaphrenium abyssinicum Hochst. in Plant. Abyss. exsicc. ii. n. 706 (*U. i.* 1842) and in Flora, 1844, p. 32 ; Engler in DC. Monogr. Phanerog. iv. p. 357, tab. xiii. fig. 15-18 (1883), *partly. Ozoroa insignis* Delile in Ann. Sc. Nat., Ser. II., xx. p. 91, t. 1, f. 3 (August 1843). *Rhus insignis* Oliv. Fl. Trop. Afr. i. p. 437.

Var. **latifolia** Engler, Pflanz. Ost-Afrik., Part C, p. 245 (1895).

Pungo Andongo.—A tree, 10 to 15 ft. high, or occasionally attaining 20 ft. ; trunk straight, 6 to 12 in. in diam. at the base, as well as the branches abounding with a brilliant whitish resin ; branches spreading,

somewhat tortuous ; flowering branchlets purplish, angular (in transverse section), clothed with a very thin tomentum ; leaves opposite ternate or sub-opposite, coriaceous, lanceolate-elliptical, deep-green above, very thinly silvery-puberulous beneath, penninerved, evergreen ; flowers white ; calyx pentaphyllous, greenish-pubescent ; corolla of 5 erect whitish petals double as long as the calyx, valvate-imbricate in æstivation, inserted under the disk, alternating with the calyx-segments ; stamens 5, inserted with the petals, with filiform filaments and small white ovate anthers ; disk cup-shaped, 5-angled, thin, with a red margin ; ovary widely obovoid, compressed, 1-celled ; style scarcely any ; stigma fleshy, very shortly 3-radiate, with patent rays compressed-capitulate at the apex and then stigmatose ; ovule 1 ; fruit compressed, broader than high, sub-bilobed, 1-seeded ; seed ascending. This tree furnishes very fine charcoal. Abundant in woods about the fortress of Pungo Andongo, in secondary thickets occurring as a shrub of 5 to 7 ft. in height ; fl. end of March 1859. No. **4405**. In bushy situations between the fortress of Pungo Andongo and Catete ; fr. Nov. 1856. The tree is called "Quitundo." No. **4406**. Cazella ; seeds Nov. 1856. Coll. Carp. 354. Catete ; seeds 1 June 1857. Coll. Carp. 355.

Huilla.—A little bushy tree, 10 to 15 ft. high, with rambling and spreading branches. In descending from the highlands of Serra da Xella to the plateau of Mumpulla, this is the first tree that strikes the traveller as totally different from those of the highland region. In leaf without fl. Oct. 1859. No. **4407**. A little shrub, or rather an undershrub ; stems erect, 1 to $2\frac{1}{2}$ ft. high, springing from a thick many-headed rootstock, leafy from the base up to the apex ; leaves rather thick, subcoriaceous, rather rigid, quite entire, glossy-green above, ashy with a very delicate tomentum beneath, obovate-oblong or elliptical ; margin cartilaginous ; lateral veins parallel, pinnately arranged, alternate. Flowers rather fleshy, crowded in pedunculate axillary or terminal panicles, hermaphrodite ; calyx pentaphyllous, imbricate in æstivation, with ovate-acuminate segments ; petals 5, alternating with the calyx-segments, ovate-acuminate, bent inwards at the apex in the bud, tomentellous outside ; stamens 5, alternating with the petals and inserted with them, scarcely exceeding the pistil ; filaments from a rather broad base gradually subulate, straight ; anthers hastate-cordate, introrse, 2-celled, attached a little below the sinus ; disk hemispherical ; ovary spherical-ovoid, fleshy, 1-celled ; ovule solitary, inserted by the filiform funicle adnate to the side of the ovary, apparently ascending ; style thick deeply trifid (or rather styles 3, combined at the base), divisions stigmatose at the oblique apex. On exposed rocks near Mumpulla, not yet in fully-open fl., and in the bushy rocky woods at the top of Serra da Xella not yet in fl. Oct. 1859. No. **4408**. A shrub (perhaps the young shoot of a burnt tree) ; rootstock large, woody, many-headed ; stems numerous, erect, 2 to 4 ft. high, flowering at the apex ; flowers white, pentamerous, only male ones seen, nor the rudiment of any ovary, unless very rarely ; disk very prominent. In shrubby stations, at the skirts of the forest, near Catumba, rather rare ; in early fl. Dec. 1859. No. **4409**.

The Quitundo is a tree of small height but with a very handsome and elegant head, presenting its foliage as if silvered in dense satiny rolls. It is met with in the district of Pungo Andongo and at the top of the Serra da Xella in the district of Huilla ; and the natives assert that the charcoal furnished by its wood is the most approved in the manufacture of small ornaments of copper and of iron with which they are accustomed to attire themselves. (See Welwitsch, Synopse, p. 16, n. 40.)

10. **RHUS** Tournef.; L.; Benth. & Hook. f. Gen. Pl. i. p. 418, partly.

1. **R. tenuinervis** Engler in DC. Monogr. Phanerog. iv. p. 423 (1883).

Toxicodendron tenuinerve O. Kuntze Rev. Gen. Pl. i. p. 154 (1891).

Benguella.—In maritime gravelly stations between the city of Benguella and the river Catumbella; fl. and fr. June 1859. No. **4418**.

2. **R. villosus** L. f. Suppl. Pl. p. 183 (1781) (*villosum*); Oliv. Fl. Trop. Afr. i. p. 439 (*villosa*); Engler in DC. Monogr. Phanerog. iv. p. 424 (*villosa*).

Toxicodendron villosum O. Kuntze Rev. Gen. Pl. i. p. 154 (1891).

Golungo Alto.—A bush, 8 to 12 ft. high, but in secondary thickets only a shrub of 4 ft.; flowers white; drupes reddish. In forests at Cambondo; fl. and young fr. June 1855. No. **4412**.

Pungo Andongo.—A bush, 8 to 12 ft. high, with quite patent branches and yellowish flowers. At the banks of the river Cuanza; fl. March 1857. No. **4415**.

Var. **obtusatus** Engler, *l.c.*, p. 425 (*obtusata*).

Bumbo.—In thickets at the base of Serra da Xella; with yellow fl. Oct. 1859. No. **4419**.

3. **R. Welwitschii** Engler in DC. Monogr. Phanerog. iv. p. 428 (1883).

Toxicodendron Welwitschii O. Kuntze Rev. Gen. Pl. i. p. 154 (1891).

Huilla.—A shrub, with very thick many-headed rootstock, and numerous erect-spreading virgate stems, 2 to 4 ft. high. In bushy hilly stations near Lopollo, with foliage but without fl. Feb. 1860. No. **4425**. A shrub with a broad hard-woody rootstock, numerous virgate sparingly branched stems, and yellowish flowers. At the skirts of bushy woods in Monino, Lopollo, abundant; fl. commencement of May 1860. No. **4426**. Between Mumpulla and Humpata; fl. Oct. 1859. No. **4427**. In the thickets of Mumpulla, with red-scarlet fr. Oct. 1859. No. **4428**. A shrub, 3 to 4 ft. high, with trifoliolate leaves, yellowish flowers spicate in a pyramidal manner, and vermilion drupaceous fruit. In the thickets of Lopollo, May 1860. Coll. Carp. 366.

4. **R. amplus** Engler in DC. Monogr. Phanerog. iv. p. 429 (1883) (*ampla*).

Toxicodendron amplum O. Kuntze Revis. Gen. Pl. i. p. 153 (1891).

Pungo Andongo.—A shrub, 5 ft. high, with erect stems branched towards the apex in a scoparioid manner, coriaceous glossy foliage, and yellowish flowers. In open wooded stations between Mangue and Candumba; fl. Jan. and March 1857. No. **4416**.

5. **R. longipes** Engler in DC. Monogr. Phanerog. iv. p. 431 (1883).

Toxicodendron longipes O. Kuntze, Rev. Gen. Pl. i. p. 154 (1891).

Golungo Alto.—A bush, 8 to 15 ft. high; in open woody stations, Queta Cazengue; fr. end of Sept. 1856. No. **4413**.

6. **R. nitidus** Engler in DC. Monogr. Phanerog. iv. p. 434 (1883) (*nitida*).

Toxicodendron nitidum O. Kuntze Revis. Gen. Pl. i. p. 154 (1891).

Pungo Andongo.—A shrub, 3 to 5 ft. high, with the habit of a *Rhus*, much branched from the base; branches elongate-virgate, densely leafy; leaves subcoriaceous, rather rigid, deep-green, rather glossy, trifoliolate; flowers greenish-yellow; fruit drupaceous. In thin forests composed of "Panda" (*Berlinia paniculata* Benth., etc.), between Mutollo and Candumba; fl. and young fr. March 1857. No. **4417**.

7. **R. angolensis** Engler in DC. Monogr. Phanerog. iv. p. 448 (1883).

Toxicodendron angolense O. Kuntze Revis. Gen. Pl. i. p. 153 (1891).

Huilla.—A little shrub, 1 to 3 ft. high; stems crowded, cæspitose, erect or ascending; leaves trifoliolate, with narrowly lanceolate leaflets; flowers greenish, apparently dicœcious; calyx 5-partite; petals 5; stamens 5, alternating with the petals; anthers 2-celled, bright-yellow; disk large, covering the bottom of the calyx, toothed at the margin, apiculate in the centre; rudiment of the style scarcely any. In rather dry wooded stations, at Catumba, Lopollo, where, in March 1860, was the camp of the Monanos; fl. 11 April 1860. No. **4429**.

The following No., with rather oblanceolate leaflets and small drupaceous fruit about $\frac{1}{6}$ in. long (in the dry shrivelled state), apparently belongs to this species:—

Huilla.—At Catumba, at the border of the forest; fr. May 1860. No. **4430**.

8. **R. mucronatus** Thunb. in Hoffm. Phytogr. Blätter, i. p. 27 (1803) (*mucronatum*); Sonder in Harv. & Sond. Fl. Cap. i. p. 513 (1860), Engler in DC. Monogr. in Phanerog. iv. p. 432 (1883) (*mucronata*); vel affinis.

Pungo Andongo.—A shrub, $1\frac{1}{2}$ ft. high, with coriaceous leaflets, and greenish-white flowers (not fully developed); perhaps a young shoot from the stock of a tree or bush. In bushy situations, near Condo; a unique specimen, in young fl. March 1857. No. **4414**.

It differs from the type by less cuneiform and rather longer leaflets; perhaps it is but a glabrous and larger-leaved variety of *R. pyroïdes* Burch.

9. **R. pyroïdes** Burch. Trav. Int. South. Afr. i. p. 340 (1822); Sonder in Harv. & Sond. Fl. Cap. i. p. 511 (1860); Engler in DC. Monogr. Phanerog. iv. p. 430 (1883); vel affinis.

Huilla.—At Mumpulla; fl. Oct. No. **4420**.

Benguella.—A shrub, 3 to 5 ft. high, much branched; with trifoliolate softly coriaceous leaves, and pale greenish-yellow flowers. In bushy sandy situations, near the city of Benguella; fl. and young fr. end of June 1859. No. **4422**.

According to Welwitsch's note he found the same species (as that of No. 4422) also near Mossamedes in the month of July; perhaps he alluded to No. 4423, herein mentioned under *R. glutinosus*.

Welwitsch's specimens differ from Burchell's type in the branchlets being never spinous and the leaves not quite glabrous.

10. **R. glutinosus** Hochst.! in Herb. Schimp. St. Abyss. ii. n. 851 (*U. i.* 1842), A. Rich. Tent. Fl. Abyss. i. p. 144 (1847) (*glutinosum*); Oliv. Fl. Trop. Afr. i. p. 438, Engler in DC. Monogr. Phanerog. iv. p. 431 (1883) (*glutinosa*); vel affinis.

Huilla.—An undershrub, 3 ft. high; at Catumba; fl. and fr. Dec. 1859. No. **4421**.

Mossamedes.—A bush, 5 to 8 ft. high; the numerous branches and the branchlets erect-patent; leaves trifoliolate. In sandy-rocky stations at the banks of the river Bero, with foliage, but without either fl. or fr. July 1859. No. **4423**.

Welwitsch's specimens differ from the type of the species by rather narrower leaflets with the midrib beneath somewhat pubescent.

11. **R. Anchietæ** Ficalho & Hiern ms. in Herb. Olyssip.

A small shrub, $2\frac{1}{2}$ to 4 in. high, with numerous stems; branchlets rather slender, subterete, purplish in the dry state, minutely lenticellate, leafy, with short internodes, glabrescent, towards the apex sparingly puberulous; leaves glabrous or glabrescent, $1\frac{1}{2}$ to $5\frac{1}{2}$ in. long (including the glabrescent or hispidulous not winged petiole of $\frac{1}{3}$ to $1\frac{1}{2}$ in.), trifoliolate; leaflets obovate or somewhat elliptic-oblong, thinly coriaceous, entire, dark-green and glabrous above, paler green and glabrous except the midrib (which is occasionally somewhat hairy towards the base) beneath, rather glossy, obtuse or rounded and usually apiculate at the apex, the lateral ones 2 to $3\frac{3}{4}$ in. long by $\frac{2}{3}$ to $1\frac{7}{8}$ in. broad and obliquely narrowed at the sessile base, the intermediate one $2\frac{1}{8}$ to 4 in. long by $\frac{3}{4}$ to 2 in. broad and more or less wedge-shaped at the subsessile or very shortly petiolulate base; lateral veins about 14 to 20 on each side of the midrib, rather slender; panicles pyramidal, hispidulous-pubescent, terminal and in the upper axils repeatedly branched, the terminal ones exceeding the young leaves, the axillary ones shorter than the leaves from the axils of which they spring; bracteoles lanceolate or subulate, pubescent; flowers numerous, sessile subsessile or shortly pedicellate, hemispherical, about $\frac{1}{20}$ in. in diam., greenish; calyx-segments ovate, somewhat pilose; petals oval, glabrous, twice as long as the calyx-segments; stamens glabrous, with short anthers; fruit subglobose or somewhat compressed, glabrous, glossy, smooth, $\frac{1}{10}$ to $\frac{1}{8}$ in. in diam.; mesocarp rather thick, apparently not vittate.

Huilla.—In the wooded parts of Monino, among tall bushes; fl. and fr. beginning of April 1860. No. **4424**.

This species was also collected at Caconda, February 1878, both in flower and fruit, by Sign. Anchieta, n. 149; it is nearly related to *R. longipes* Engl.

12. **R. virgatus** Hiern, sp. n.

Shrubby, with elongate virgate leafy closely pubescent and hirsute branches, 3 ft. long or more; leaves pubescent especially on the principal veins and revolute entire margins, trifoliolate; petiole mostly very short, but ranging up to $\frac{1}{4}$ in. in length; leaflets coriaceous, elliptical or somewhat obovate, shortly apiculate at the subacute or obtuse apex, more or less narrowed at the base, dark green above, somewhat tawny-green beneath, the lateral ones 1 to $1\frac{1}{3}$ in. long by $\frac{3}{8}$ to $\frac{1}{2}$ in. broad and sessile, the intermediate one $1\frac{3}{8}$ to $1\frac{3}{4}$ in. long by $\frac{1}{2}$ to $\frac{3}{4}$ in. broad and sessile or subsessile; lateral veins numerous, not conspicuous; inflorescence

axillary and terminal, about $\frac{3}{4}$ to 1 in. long (in fruit), pubescent; bracteole small, subulate, pubescent; pedicels very short; fruit depresso-globose, shining, smooth, glabrous, tipped by the remains of the 3 styles and based by the small pubescent calyx, $\frac{1}{4}$ in. in diam.

Golungo Alto.—In fruit. No. **4410**.

Pungo Andongo.—In fruit and flower-bud, November. No. **4411**.

Nearly related, by its very short petioles and habit of growth, to *R. angolensis* Engl.

13. **R. heptaphyllus** Hiern, sp. n.

A resinous-aromatic, copiously leafy tree, 20 to 30 ft. high, much branched and forming a widely dilated head, glabrous or nearly so throughout except the puberulous young parts and inflorescence; branches terete; branchlets slightly and obtusely angular, somewhat arching; leaves impari-pinnate or oval-obovate, 3- or 2-jugate, 3 to 6 in. long; internodes short; common petiole $\frac{2}{3}$ to 1 in. long, not or scarcely winged; leaflets oblanceolate-obovate, rounded emarginate or scarcely mucronate at the apex, wedge-shaped at the base, narrowly revolute along the margin, entire, rigidly chartaceous, dark green above, pale and rather ruddy-green with impressed but not conspicuous venation (except the midrib) beneath, sessile; the terminal leaflet $1\frac{1}{2}$ to 3 in. long by $\frac{1}{2}$ to 1 in. broad, oblanceolate-obovate; the lateral leaflets 1 to $2\frac{1}{4}$ in. long by $\frac{1}{3}$ to $\frac{2}{3}$ in. broad, oval-obovate; the axis of the leaf between the insertions of the leaflets narrowly winged, the wings narrowing downwards and becoming obsolete in the lower parts of these intervals; inflorescence consisting of pyramidal panicles inserted in the upper axils about 2 to $2\frac{1}{2}$ in. long, and forming compound leafy quasi-terminal panicles about 5 in. long; ultimate pedicels very short, puberulous; bracteoles small, ovate, acute. Male flowers small, about $\frac{1}{16}$ in. long, white or turning yellowish, fragrant, subglabrous, abundantly visited by coleopterous insects of the genera *Lycus* and *Cetonia*; calyx deeply and equally 5-lobed, lobes ovate; petals 5, ovate-lanceolate, alternating with and twice as long as the calyx-lobes, imbricate in æstivation, scarcely squamulate at the base, inserted without a claw below the depressed-cup-shaped deeply 10-crenate waxy-yellow disk; stamens 8 to 10, with unequal flattened linear-lanceolate acuminate naked filaments, inserted with the petals; ovary abortive, small and globose or wanting; style 1, obscurely 3-lobed at the apex. Female flowers and fruit not seen.

Loanda.—In dry sandy maritime situations, rather rare; fl. April and May 1854. Possibly an introduced tree. At Ponta d'Isabella, near the city of Loanda, with male fl. 13 May 1858. No. **4531**.

XLIII. CONNARACEÆ.

The Connaraceæ, consisting for the greater part of shrubs or woody climbers of the genera *Rourea* and *Cnestis*, form a great feature in the primitive forests of the hilly and highland regions, by reason of their remarkable fruits, nearly always covered with

a scarlet velvet. There are two or three species which have a habit very similar to that of the genus *Averrhoa* of Oxalideæ. The scarlet velvet which clothes the fruits of some species excites in the skin the same strong itching as nettles cause; this stinging is due to the presence of bristles similar to those which occur in *Mucuna* and in some species of Euphorbiaceæ. (See Welwitsch, Apontamentos, p. 565, n. 156.)

The fruits of *Sabongo* supply an aromatic drug, which the natives of Hungo, a country on the confines of the district of Golungo Alto, bring to the markets at Loanda; they are in much request by the negro population, who prepare from them various stomachic remedies; the fruits seem to be always threaded in the form of a rosary, and each rosary is sold at the price of from 50 to 150 milreis, according to their greater or less abundance in the market. The fruits appeared to Welwitsch to belong to a tree of the family of Connaraceæ, but he had no opportunity of ascertaining their origin; the people of Hungo, however, assured him that they were furnished by a large and very leafy tree. (See Welwitsch, Synopse Explic. p. 29, n. 65.) They probably belong to *Xylopicrum æthiopicum* in Anonaceæ, and are represented in the collection by Coll. Carp. 186.

1. **ROUREA** Aubl.; Benth. & Hook. f. Gen. Pl. i. p. 432. *Byrsocarpus* Schum. & Thonn.; Benth. & Hook. f., *l.c.*, p. 431.

1. **R. coccinea** Hook. f. ex Benth. in Hook. Niger Fl. p. 290 (1849). *Byrsocarpus coccineus* Schum. & Thonn. Guin. Plant. p. 226 (1827); Baker in Oliv. Fl. Trop. Afr. i. p. 452. *B. puniceus* Schum. & Thonn., *l.c.*, p. 227. *B. parvifolius* Planch. in Linnæa xxiii. p. 412 (1850).

Golungo Alto.—A shrub or bush, 4 to 6 ft. high, standing erect or climbing, branched from the base, the stems spreading rod-like branches and branchlets slender and beset with crowded purple-brown lenticels, flowering in October without leaves and again in March with leaves, very elegant especially in the fruiting state. Leaves very sensitive, deciduous, impari-pinnate; leaflets alternate, small, elliptical, herbaceous-subpapery, reticulate, shortly petiolulate. Flowers small, agreeably scented, arranged in axillary solitary or grouped racemes, pedunculate; pedicels jointed, elongated, bearing one bract. Calyx-segments 5, imbricate in æstivation, subovate-orbicular, concave, ciliolate at the margin, furnished at the apex with a hairy mane, scarcely patent, herbaceous-green. Petals 5, sessile, milk-white, twice longer than the calyx, inserted below the torus, convolute in æstivation (sinistrorsely as seen from within). Stamens 10, coalescent at the base into a short disk-shaped cup, the alternate ones, namely those opposite the petals, much longer than the others; anthers 2-celled, dehiscing longitudinally. Styles 5, quite free from the base upwards, elongated, thickened and densely bearded at the base, erect, tipped by the capitate not bifid stigmas. Fruit oblong, $\frac{1}{2}$ in. long, cylindrical, scarlet, shining, pendulous, tardily dehiscing, resembling in shape and colour the berries of *Capsicum Comarim*. Seed solitary. Not uncommon by the elevated thickets about Camilungo, Bumba, Sange, etc.; fl. Sept., Oct., Dec., March, and sometimes in May; fr. Dec. and May. No. **4622**. A

scandent or standing erect sarmentose shrub ; branches and older branchlets dark-brown and very densely beset with very small whitish excrescences. Calyx segments imbricate in æstivation, concave, uniformly reddish, glabrous, the upper edge ciliolate. Stamens 10 ; carpels 5, nearly separate, villous, 4 of them regularly abortive ; styles 5, distinct. Fruit short, scarlet, pendulous, ellipsoidal-cylindrical, 1-seeded, for a time indehiscent. No. **4623**. A very slender shrub, occasionally scandent ; leaves deciduous ; flowers whitish-reddish, sometimes almost rose-coloured ; fruit very bright scarlet, pendulous. Abundant by the denser thickets ; fl. Dec. 1854. No. **4624**. In fr. May, at the same places as the flowering specimens of the last No. No. **4625**. In the above-quoted Nos. the foliage differs considerably in the size of the leaflets, perhaps partly due to age. A sarmentose-subscandent shrub, with white flowers and scarlet baccate fruit similar to that of *Berberis vulgaris* L. ; Sange, Jan. 1856. Coll. Carp. 365.

2. **R. cassioides** Hiern, sp. n.

A slender climbing shrub, with the habit of a *Cassia* or of *Millettia gracilis* Welw. Herb. Nos. 1854, 1855 ; branches glabrescent, terete, leafy, covered with a dark bark ; lenticels not so abundant as in *R. coccinea* Hook. f. ; leaves impari-pinnate, about 9-jugate, 4 to 7 in. long ; petiole $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, puberulous ; lateral petiolules very short, beset with short dark spreading hairs, opposite or slightly alternate, the pairs $\frac{1}{4}$ to $\frac{1}{2}$ in. apart, the terminal petiolule $\frac{1}{8}$ to $\frac{1}{3}$ in. long, hairy ; leaflets oval-oblong or the terminal one obovate, somewhat retuse at the apex, the lateral ones obtuse and unequal at the base, chartaceous, deep green and glabrate above, paler and not quite glabrous beneath, shortly ciliolate on the margin, $\frac{1}{2}$ to $1\frac{5}{8}$ in. long by $\frac{1}{3}$ to $\frac{3}{4}$ in. broad ; lateral veins about 4 on each side of midrib, not conspicuous ; fruit baccate-drupaceous, not inflated, brilliantly scarlet, cylindrical, soft when ripe, glabrate, not pendulous, $\frac{3}{4}$ in. long, on a bracteolate peduncle of $\frac{1}{2}$ to $\frac{3}{4}$ in., lateral on the branchlets ; fruiting calyx $\frac{1}{3}$ in. diam. ; segments 5, ovate, imbricate at the base, $\frac{1}{8}$ in. long, ciliolate at the apex, applied to the base of the fruit. Seed solitary, exalbuminous.

Golungo Alto.—In less dense forests between Muria and Trombeta, but very rarely met with ; fr. Sept. 1854. In the dense forests of the mountains of Queta, but rather rare ; fr. Dec. 1855. No. **4627**.

3. **R.** (Byrsocarpus) **fasciculata** Gilg in Engl. Bot. Jahrb. xiv. p. 329 (1891).

Var. **flagelliflora** (Welw.).

Inflorescence forming terminal slender whip-like spikes 18 to 24 in. long, leafless or at the lower nodes bracteate.

Cazengo.—A slender shrub, climbing high and widely ; stem about an inch in diam. and spinous in the lower part ; flowers of a whitish-rosy colour ; fruit scarlet ; seed black-shining. In the primitive forests of Muxaûla, but sparingly ; fl. and fr. June 1855. No. **4628**.

4. **R. venulosa** Hiern, sp. n.

A robust climbing shrub, 5 to 8 ft. high, glabrate except the young parts and inflorescence ; branchlets pendulous, covered with a dark bark scattered with pallid lenticels, terete ; leaves impari-pinnate, 4- or 3-jugate, $4\frac{1}{2}$ to 9 in. long ; petiole $\frac{1}{2}$ to $2\frac{1}{2}$ in. long,

rather slender; leaflets elliptical or oblong, rather obovate, acuminate at the apex, rounded or somewhat narrowed towards the base, thinly coriaceous, deep-green and rather glossy above, paler beneath, with about 5 principal lateral veins on each side of the midrib which are erect-patent and prominent below and less so above, marked with numerous transverse veinlets, $1\frac{1}{2}$ to $3\frac{1}{2}$ in. long by $\frac{1}{2}$ to $1\frac{3}{4}$ in. wide, nearly opposite or rather alternate; petiolules $\frac{1}{12}$ to $\frac{1}{6}$ in. long, the terminal one longer; inflorescence lateral or axillary, in clustered thyrsoid branched racemes, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, tawny-pubescent, becoming less hairy as the flowers develope; pedicels short, bracteolate; flowers about $\frac{1}{4}$ in. long, numerous; calyx hemispherical, $\frac{1}{12}$ in. long, deeply 5-lobed, segments ovate-deltoid, puberulous, ciliolate, imbricate, not or scarcely accrescent; petals of a whitish-rose colour, oblong, free, about three times as long as the calyx; stamens 10, glabrous, 5 alternately longer and about equalling the calyx; filaments dilated and adjacent at the base; carpels 5, hairy below; styles 5, nearly equalling the petals, terminating in the small bifid stigmas, glabrous; follicle solitary, sessile on the spreading calyx, glabrate, gibbous at the base, a little curved, nearly 1 in. long, green, red towards the apex, smooth, fleshy-coriaceous, dehiscent; arillode scarlet, covering nearly the whole of the seed and very fleshy; seed solitary, erect, exalbuminous.

Pungo Andongo.—In damp very shady places, in the deep valleys amongst the gigantic rocks of Cabondo; fl. and fr. end of Nov. 1856; sporadic. No. **4630**. In wooded situations about Pedra Cabondo; abundant; fl. April, fr. Jan. 1857. No. **4631**.

5. **R. pallens** Hiern, sp. n.

A climbing shrub, glabrous in most parts; branchlets terete, closely lenticellate, rather slender, leafy towards the apex; leaves impari-pinnate or trifoliolate, 2- or 1-jugate, pallid, 4 to 8 in. long; petiole $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, terete, slender except the tumid wrinkled base; lateral petiolules $\frac{1}{10}$ to $\frac{1}{8}$ in. long, opposite or somewhat alternate, the terminal petiolule $\frac{1}{2}$ to 1 in. long; leaflets 5 or 3, ellipsoidal, much acuminate at the apex, the lateral ones somewhat unequal at the base, all chartaceous or thinly coriaceous, inconspicuously veined, 2 to $4\frac{1}{2}$ in. long by $\frac{2}{3}$ to $1\frac{3}{4}$ in. wide; the terminal leaflet rather the largest; infructescence lateral or axillary, short, glabrate, $1\frac{1}{4}$ to $1\frac{3}{4}$ in. long; fruit oblong, slightly curved, $\frac{3}{4}$ in. long, scarlet, coriaceous, based by the persistent hemispherical 5-partite calyx $\frac{1}{4}$ in. in diam., the segments of which are still slightly imbricate at the base; seed black.

Cazengo.—In the primitive forests of Cabondo, but rather rare; fr. June 1855. No. **4629**.

2. **AGELÆA** Soland.; Benth. & Hook. f. Gen. Pl. i. p. 432.

1. **A. nitida** Solander ex Planchon in Linnæa xxiii. p. 437 (1850).

Cnestis obliqua Pal de Beauv. Fl. Owar. i. p. 97, t. 59 (1804).

A. obliqua Baker in Oliv. Fl. Trop. Afr. i. p. 454.

Golungo Alto.—A high-climbing shrub ; stem 1½ to 3 in. in diam. at the base ; flowers whitish, inclining to violet ; fruit pear-shaped, reddish. In dense forests, on the northern side of the mountains of Queta ; fl. April, fr. May 1855. No. **4641**.

Pungo Andongo.—Leaves (in the study set) ranging up to 7 in. long by 5 in. broad, leaflets to 3¾ by 2⅛, and petiole to 2⅓ ; fruiting raceme axillary, 3½ in. long, bearing 8 fruits ; in one instance two carpels perfected and belonging to the same flower. No. **4640**.

3. **CONNARUS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 432.

1. **C. florulentus** Thonning ex DC. Prodr. ii. p. 86 (1825).

C. floribundus Schum. & Thonn. Guin. Plant. p. 299 (1827) ; Baker in Oliv. Fl. Trop. Afr. i. p. 457 ; non Planch. in Linnæa xxiii. p. 435 (1850) ; nec Wall. *Omphalobium Thonningii* DC., *l.c.* *O. Smeathmanni* DC., *l.c.* *C. Smeathmanni* Baker, *l.c.*, p. 458. *C. Griffonianus* Baill. in Adans. vii. p. 235 (1867).

Pungo Andongo.—A very beautiful robust shrub, widely scandent ; flowers when fully expanded yellow ; in dense primitive forests, near Quiembongo and in Mata de Cabondo within the lines of fortification of Pungo Andongo, rather rare ; fr. Dec. 1856 at Songue ; in flower-bud Jan. 1857 ; fl. and young fr. end of Feb. 1857 ; fr. May 1857. A low bush, with sarmentose branches, rare ; fl. not yet expanded March 1857. No. **614**. An evergreen climbing shrub ; leaves hard-coriaceous, discoloured beneath ; petals 5, waxy-yellow ; stamens 10, the 5 longer ones exserted and fertile, the 5 shorter ones included and sterile ; style included, incurved, with a green capitate stigma ; by the thickets of the rocks of the fortress of Pungo Andongo ; sparingly in fl. 14 Nov. 1856. No. **4638**.

Welwitsch's specimens are intermediate in character between the two species quoted above from the Flora of Tropical Africa, and warrant their union into one species.

2. **C. (?) punctulatus** Hiern, sp. n.

A climbing shrub; leaf (only one seen) pinnate, 1½ ft. long, bearing 4 leaflets, but perhaps not having developed all its leaflets ; petiole 9½ in. long ; leaflets ovate, obtusely narrowed at both ends, thinly coriaceous, glossy, glabrous, delicately veined and reticulate, pellucid-punctate, entire, about 4 in. long by 2 in. wide ; petiolule ⅙ in. long, glabrous ; inflorescence paniculate, puberulous, many-flowered ; ultimate pedicels very short ; flower-buds ovoid, purple-scarlet (afterwards destroyed by insects, and so not seen in open flower), ⅛ in. long ; calyx puberulous, deeply 5-partite ; segments imbricate, oblong-ovate ; petals 5, glabrous ; stamens 10, glabrous, with filaments alternately longer and shorter and dilated towards the base and there united, in one row and with short anthers ; carpels 5, ovaries hairy tapering into the hairy styles and tipped with glabrous stigmas.

Golungo Alto.—Queta, in flower-bud May 1856. No. **6685**.

4. **MANOTES** Soland. ; Benth. & Hook. f. Gen. Pl. i. p. 433.

1. **M. Griffoniana** Baill. in Adansonia vii. p. 244 (1867) ; Baker in Oliv. Fl. Trop. Afr. i. p. 460.

Golungo Alto.—A tree, 12 to 13 ft. high ; branches spreading :

leaflets coriaceous, glossy; flowers (for the most part only in bud) deeply cinnamon-ferruginous; styles apparently 5. In the denser primitive forests of Mata de Quisuculo in Sobato de Bango; fl. Sept. 1855. No. **4639**.

2. **M.** (?) **macrophylla** Hiern, sp. n.

A high-climbing shrub, glabrous except the youngest parts and the inflorescence; branchlets terete, slender, wiry, somewhat flexuous, sparingly lenticellate; leaves impari-pinnate, 10 to 16 in. long, 3- or 4-jugate; petiole 2 to $4\frac{1}{2}$ in. long; petiolules all short, $\frac{1}{6}$ to $\frac{1}{3}$ in. long; leaflets opposite or nearly so, oval or oblong or often somewhat obovate and shortly acuminate, $2\frac{1}{2}$ to 5 in. long by 1 to $2\frac{1}{2}$ in. wide, chartaceous or thinly coriaceous, glossy, delicately veined; the lateral ones unequal and obtuse or rounded at the base; inflorescence clothed with closely-set short hairs, consisting of pyramidal panicles, 9 in. long or more; ultimate pedicels very short; bracteoles subulate, deciduous, those next the calyx shorter than it; flower-buds ovoid, $\frac{1}{6}$ in. long, clothed with very short hairs; calyx 5-partite, valvate, with ovate-lanceolate segments; petals 5, glabrous; stamens 10, glabrous, alternately longer and shorter; anthers short; pistil hairy. Neither expanded flowers nor fruits appear on the specimens.

Golungo Alto.—In the forests of Mussengue, near Undelle; flower-bud May 1856. No. **613**.

5. **CNESTIS** Juss.; Benth. & Hook. Gen. Pl. i. p. 433.

1. **C. corniculata** Lam. Encycl. Méth. iii. p. 23 (1789); Baker in Oliv. Fl. Trop. Afr. i. p. 461; non Benth. in Hook. Niger Fl. p. 290 (1849).

Spondioïdes pruriens Smeathm. ex Lam., *l.c.*

Golungo Alto.—A climbing shrub, frequenting the tallest trees; flowers racemose, pendulous, inclining from white to reddish; fruit follicular, purple-velvety outside. In palm-groves and in dense woods, near Fonte de Capopa and Ponte do Felix Simões; fl. and fr. Feb. 1855. No. **4633**. A lovely slender high-climbing shrub, afterwards hanging down; leaflets coriaceous, glossy; flowers whitish or somewhat flesh-coloured; fruit follicular, legume-shaped, scarlet-velvety outside, very beautiful but covered with rather rigid and highly prurient bristles; seeds oblong, purple-black, shining, with a large orange-coloured arillode. In palm-groves and shady woods near N-delle; fl. March 1856, fr. Jan. 1855; also at N-delle in May 1855. No. **4634**. A tall-climbing shrub; fruit bi-corniculate, the horns pod-shaped, of a brilliant scarlet colour, beset with rather rigid stinging bristles; near Sange, excursion to Capopa, 8 Oct. 1854. Coll. Carp. 362.

2. **C. ferruginea** DC. Prodr. ii. p. 87 (1825); Baker in Oliv. Fl. Trop. Afr. i. p. 461.

Spondioïdes ferruginea Smeathm. ex DC., *l.c.*

Golungo Alto.—An evergreen shrub, 4 to 6 ft. high; flowers apparently polygamous; calyx 5-partite, almost pentaphyllous, with ferruginous segments valvate in æstivation; petals 5, ovate, concave, white; stamens 10; carpels 5 (or 3 to 4 by abortion), pilose. Road to

Mussengue, in woods; fl. May 1855. No. **4637**. In the forests of Sobato Mussengue; fl. Feb. 1855. No. **4636**.

The next following No., in dehisced fruit, which has larger foliage with leaflets ranging up to 4 in. long by $1\frac{1}{4}$ in. broad, perhaps belongs to this species:—

Sierra Leone.—No. **4635**.

Also the following fruits and seeds from the Carpological Collection:—

Golungo Alto.—A climbing shrub; fruit fleshy-coriaceous brilliantly scarlet-velvety outside; seed black, shining, with a bright-orange cup-shaped arillode; Sange, Dec. 1855. Coll. Carp. 364. An evergreen shrub, standing erect; leaves pinnate; flowers yellowish; fruit follicular, pod-shaped, coriaceous, scarlet-velvety, monospermous; seed cylindrical-obovoid, shining, black, with an orange-coloured arillode. Mata Quisuculo; Bango, Sept. 1855. Coll. Carp. 363.

XLIV. LEGUMINOSÆ.

The sub-order Papilionaceæ is represented in the Angolan flora by a great abundance both of species and individuals; in the littoral region the genera *Crotalaria*, *Indigofera*, and *Cracca* predominate in the meadows and sandy fields, on the hills and at the margins of streams and stagnant waters; various species of *Sesban*, *Æschynomene* and *Meibomia* inhabit moist soils; the beautiful *Herminiera Elaphroxylon* and *Drepanocarpus lunatus*, as well as climbing species of *Vigna*, ornament the banks of the rivers Bengo, Dande, and Lifune; and gradually, as the country successively rises towards the interior, the species are increased in number, becoming more shrubby and also arborescent, so that in the mountainous region various handsome trees of this sub-order comprise a considerable proportion of the primitive forests, in which the genera *Millettia*, *Pterocarpus*, etc., are conspicuous. The arborescent *Erythrina suberifera* covers the rocky fields, and a multitude of woody climbers, such as *Physostigma cylindrosperma*, of bright colours and very various habit, adorn the banks of rivulets, entwining themselves in coils on gigantic trees up to the top and thence hanging down in garlands of flowers. This abundant display of what is beautiful and interesting in the vegetable kingdom is continued and even augmented in the highland region, where these trees and climbers appear in luxuriant grandeur.

Not less varied is the use which the natives make chiefly of the roots, bark and wood, as for instance with respect to Molungo (*Erythrina suberifera*), Tacula (*Pterocarpus erinaceus*), Mutalamenha (*Lonchocarpus sericeus*), and Páo quisecua (*Millettia rhodantha*).

Among the plants cultivated on a greater or smaller scale, the following principally deserve mention, arranged according to their importance:—

1. The common kidney-bean (Feijão), *Phaseolus vulgaris* L., is cultivated throughout the province; there are more than twenty-

five varieties, differing in shape, colour and size of the seeds; a white variety, of an elliptical form and thin skin, is considered the best tasted.

2. The small kidney-bean (Feijão espadinho), *Phaseolus lunatus* L., is less commonly cultivated.

3. The ground-nut (Jinguba), *Arachis hypogæa* L., is cultivated on a large scale, especially in the district of Ambaca, both for the consumption of its seeds and for the extraction of oil; there are two varieties.

4. The catyang (Feijão macundi), *Vigna catjang* Walp., is cultivated in abundance especially in moist soils; there are several varieties.

5. *Dolichos Lablab* L.; there are several varieties.

6. *Cajan indorum* Medik. (Jinsonge or Quinsonge) is generally cultivated, but not on so large a scale as it deserves.

7. The earth-pea (Viélo or Jinguba de Cambambe), *Voandzeia subterranea* P. Thouars, is cultivated chiefly in the districts of Pungo Andongo, Cambambe, and Ambaca, and ought to be so more generally.

8. The chick-pea (Grão de bico), *Cicer arietinum* L., is cultivated in the district of Mossamedes.

9. The common pea (Ervilha), *Pisum sativum* L.; both ordinary and the Ervilha torta.

10. The common bean (Favas), *Vicia Faba* L., is cultivated only by a few horticulturists, and rarely comes to perfection.

11. *Cracca Vogelii* O. Kuntze (Cafoto), an elegant bush or small tree, is indigenous; it is also cultivated for catching fish, since its leaves and branches when well pounded and thrown into the rivers poison the fish and enable them to be caught with the greatest ease.

12. *Eriosema Muxiria* Welw. (Muxiri) is a small tree indigenous on the banks of the Cuanza, and is at times cultivated for the sake of its root, which, like the seeds of the grass *Eleusine coracana* Pers., serves the natives for the brewing of a kind of beer called "Oála."

13. *Dolichos Dongaluta* Welw. (Dongaluta); the thick fleshy-fibrous rhizome is reduced to powder and used as a remedy in cases of gangrenous quinsy.

14. *Canavali incurva* P. Thouars (Faba da India), with rose-coloured or scarlet flowers, is cultivated and occasionally subspontaneous.

15. The Anil, *Indigofera Anil* L., is cultivated in small quantities in the vicinity of the dwellings of the natives.

The sub-order Cæsalpinieæ is rare in the littoral region, and is chiefly represented by some species of the genera *Cassia* and *Bauhinia*; *Parkinsonia aculeata* L., and also *Cæsalpinia Bonducella* Roxb., known as common trees or shrubs on the African coast to the north of the equator, become very rare in Angola, or are perhaps entirely wanting; at all events, Welwitsch looked for them in vain. In the mountainous region, on the other hand,

numerous very interesting species suddenly appear, both shrubby and arborescent as well as climbers; the elegant *Cassia mimosoides* L., with several other species not less handsome, and an arborescent one of the same genus, clothe the primitive forests; the critical genera *Mezoneurum*, *Berlinia*, *Baphia*, and *Vouapa*, contain various species, several of which were not previously known; also a new *Intsia*, with its head shaped like a parasol, in company with two arborescent species of *Bauhinia*, and usually mixed with various trees of other orders. In the highland region all this is changed, as here occur masses of arborescent Cæsalpinieæ, constituting at least in certain stations almost exclusively the forests on the elevated table-land of Pungo Andongo, known locally by the name of Matas de Panda, the physiognomy and phytographical character of which are totally different from those of the primitive forests of Golungo Alto and the other districts belonging to the mountainous region. The timber in the greater proportion of the trees of this sub-order furnish excellent material for the various domestic purposes; and that of M-Pundo, *Intsia cuanzensis* O. Kuntze, is much valued by the natives for making articles for presents, as, for example, the drum of Marimbas, the principal musical instruments in use among the natives. Among the medicinal plants mention should be made of the Mulólo, *Bauhinia reticulata* DC., the bark of which is used in decoction to cleanse impure ulcers, and of the Mudianhoca, *Cassia occidentalis* L., an herbaceous plant whose root is very bitter and used with good results in cases of intermittent fevers. The tamarind, *Tamarindus indica* L., is frequently cultivated in the coast region; but although it is found growing wild by the banks of streams in various places, it was certainly introduced from the East Indies; it not very often occurs in the mountainous region, and it is still rarer in the highlands. The fruit and pulp of the tamarind in the chemists' shops in Loanda come from Brazil. *Cæsalpinia pulcherrima* Sw. is generally cultivated and thrives well in all the regions, growing at times—as, for instance, in Pungo Andongo—into small trees with bushy heads covered with innumerable very beautiful flowers of the brightest scarlet; a decoction of the root is administered by the negro doctors in cases of intermittent fever, and an infusion of the leaves, they affirm, acts like leaves of senna. *Cassia Sieberiana* DC., an arborescent plant, whose pods measure 14 to 24 inches and much resemble those of *C. Fistula* L., occurs, though rarely, in the forests of the fortress of Pungo Andongo, and becomes more frequent in Songo and the eastern Congo, where the natives call it "Mossambe" and the fruit "Mósua." Among the species whose introduction into Angola ought to be attempted, especially in the district of Loanda, Welwitsch specified the following:—The Algaroba bean (*Ceratonia Siliqua* L.), the Judas tree (*Cercis Siliquastrum* L.), and the Honey-locust tree or thorn of Virginia (*Gleditsia triacanthos* L.); all these trees possess a beautiful habit, and are content with a dry or rocky light soil.

The sub-order Mimoseæ occurs with more or less abundance in

all the regions, but is least frequent in the littoral region, increasing gradually towards the interior of the country, and is represented in the mountainous region by a large number of arborescent specimens which contribute a conspicuous feature to its vegetation. In the coast region the shrubby *Mimosa pigra* L. abounds in moist soils, and in dry places dense low forests are sometimes composed almost exclusively of the very elegant *Dichrostachys nutans* Benth., while the more elevated hills are in many places covered with thin woods of spiny Acacias called Espinheiros (thorns); in the lower parts of the mountainous regions a second species of the genus, *D. platycarpa* Welw., occurs. *Gigalobium scandens*, which has pods 3 or 4 feet long, and a woody climber with pentagonal stem (*Acacia pennata* Willd., var. *dolichosperma* Oliv.), occur as gigantic climbers in Golungo Alto and Cazengo. In the highland region the sub-order is also abundant, but it diminishes, little by little, from Pedras de Guinga in Pungo Andongo eastwards, especially in number of individuals. The greater part exude in quantity gums of various quality, and the bark of several, especially of the tree called "Muzemba" (*Albizzia coriaria* Welw.), furnishes excellent material for tanning leather; the trees which furnish gum arabic are most frequent south of the river Cuanza; the timber is only valuable when well advanced in age. Only one species is cultivated by the natives, and that rarely; it is the thorn *Acacia farnesiana* Willd., which is also cultivated in Portugal for the sake of the very agreeable fragrance of its flowers; the negroes, however, grow it for its pods, which constitute the chief ingredient in the preparation of a black dye with which they stain the cloths called "Mabella" or "Mabéla" made from palm-leaves. In the forests of Pungo Andongo *Parkia filicoidea* Welw. occurs, but the seeds could not be obtained because the monkeys, so numerous in the country, devour all the pods while they are yet green. *Parkia africana* Br., a handsome tree, which is indigenous in the country north of the equator from Senegambia to the Gaboon, well deserves to be introduced into Angola for the sake of the edible seeds which it produces. (See Welwitsch, Apontamentos, pp. 572 to 576, nn. 174 to 176.)

1. Sub-order Papilionaceæ.

1. **LOTONONIS** DC.; Benth. & Hook. f. Gen. Pl. i. p. 476.

1. **L. tenuis** Baker in Oliv. Fl. Trop. Afr. ii. p. 5 (1871).

Mossamedes.—A prostrate-ascending annual herb with rather small yellowish flowers. Rather rare, in gravelly places by the river Bero; very sparingly fl. and fr. middle of July 1859. No. **1900**.

2. **L. clandestina** Benth. in Hook. Lond. Journ. Bot. ii. p. 607 (1843); Baker, *l.c.*, p. 6.

Mossamedes.—A slender brittle silky-villous annual herb; stem and branches prostrate; petiole flattened-dilated; standard and wings rather deep-yellow; keel pale-yellow, much prolonged, twice as long as the wings. Rather rare, in sandy maritime and sub-maritime places

about Saco de Giraûl and at the mouth of the river Giraûl ; fl. and fr. 19 July, 1859. No. **1903**.

3. **L. angolensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 6.

Pungo Andongo.—In shortly bushy damp spots near Quitage, sparingly ; fl. and fr. March 1857. No. **1895**.

Huilla.—A glabrous trifoliolate perennial herb, habit remarkably like that of an *Astragalus* ; stems prostrate ; stipules 2, lanceolate-linear ; flowers pale-yellow ; standard oblong, acuminate, shorter than the keel ; the longer anthers basifixed, placed on the shorter filaments ; style a little curved, glabrous ; stigma oblique ; pods at maturity almost compressed, turgid a little before dehiscence ; funicle of the seeds very long, filiform. In sparingly bushy damp pastures between Lopollo and Ferrão da Sola, on the right bank of the river of Lopollo, not common ; fl. and fr. beginning of April 1860. No. **1896**.

2. **ROTHIA** Pers. ; Benth. & Hook. f. Gen. Pl. i. p. 477.

1. **R. hirsuta** Baker in Oliv. Fl. Trop. Afr. ii. p. 7.

Xerocarpus hirsutus Guill. & Perr. Fl. Senegamb. Tent. p. 170, t. 44 (1832). *Westonia hirsuta* O. Kuntze, Rev. Gen. Pl. i. p. 213 (1891).

Huilla.—An annual prostrate scentless herb, with the aspect of a *Trigonella* ; branches alternate ; leaves trifoliolate, rather pilose ; flowers small, whitish-violet, collected in abbreviated leaf-opposed racemes ; pods lanceolate-acuminate, rather compressed sub-torulose, deflexed, $\frac{1}{2}$ in. long, with many reniform seeds. In damp meadows at the river of Lopollo ; fl. and fr. 27 March, 1860. No. **1904**. Corolla from whitish to violet, at length yellowish ; sparingly in the shortly grassy pastures of Empalanca, at an elevation of 5500 ft., flooded in the rainy season ; fl. and fr. April 1860. No. **1905**.

3. **CROTALARIA** Dillen., L.; Benth. & Hook. f. Gen. Pl. i. p. 479.

1. **C. glauca** Willd. Sp. Pl. iii. p. 974 (1800); Baker in Oliv. Fl. Trop. Afr. ii. p. 12.

Golungo Alto.—An annual herb, 2 to $3\frac{1}{2}$ ft. high, erect or ascending at the base ; leaves glaucescent, erect, appressed to the stem ; standard pale-yellow marked with orange striæ ; wings yellow ; keel greenish-yellow ; pod 1 in. long, nodding, cylindric-turgid. Not common, on grassy slopes among the mountains of Alto Queta, in company with *Gladiolus angolensis* Welw. Herb. No. 1527 ; fl. and young fr. 19 March, 1856, ripe fr. March 1856. No. **1949**.

Pungo Andongo.—In sandy thickets between Quibinda and Quitage ; a unique specimen fl. March 1857, probably belonging to this species. No. **1947**. An annual glaucescent herb, with the habit of a *Lathyrus* and with yellow flowers ; in meadows along the banks of the river Luxillo, rare ; fl. and fr. April 1857 ; a form with the lower leaves oval. No. **4153**.

Var. ? **anisophylla** (Welw. ms.).

An annual herb, erect, a foot high, ascending-branched at the base, puberulous ; leaves simple, articulated with the petiole, glabrate above, puberulous beneath, apiculate ; the lower ones lanceolate or narrowly oval, 1 to 4 by $\frac{1}{3}$ to $\frac{1}{2}$ in. ; the upper ones elongate-linear, canaliculate, long-acuminate, erect, 3 to 6 by

$\frac{1}{6}$ to $\frac{1}{3}$ in.; calyx puberulous, shortly campanulate; teeth of the limb long, lanceolate, 5, subequal; standard purplish; keel and wings yellow; ovary stipitate, oblong, rather compressed, with several ovules; style bearded above within; pods sub-cylindrical, inflated, stipitate. straight, 1 by $\frac{2}{5}$ in.; seeds numerous, reniform.

Huilla.—In marshy places along the banks of streams near Lopollo (Varzea de Catumba), scarce; fl. and fr. March 1860. No. **1950.**

This may prove to be a distinct species as suspected by Welwitsch, though not so regarded by Baker, *l.c.*; it differs by its foliage and by not being glabrous.

2. **C. spartea** "R. Br." [Planch.] ex Baker, *l.c.*, p. 12.

Huilla.—Flowers yellow; standard tawny. In the wooded sandy meadows of Monino, damp at the time of gathering, in company with species of *Gladiolus*, *Polygala*, and a shrubby *Protea*, abundant; fl. and young fr. March and April 1860. No. **1948.**

3. **C. stenoptera** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 12.

Huilla.—Branches erect-spreading, from the base of the stem, narrowly winged; flowers yellow, marked with violet. In damp wooded meadows between Catumba and Hây; fl. and fr. April 1860. No. **1946.**

4. **C. holoptera** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 13.

Pungo Andongo.—Branches virgate-elongated, erect, from the base of the stem, broadly winged along their whole length; leaves sessile, elliptic-lanceolate, rigid; flowers yellowish; pods oblong, turgid, very blunt. In sandy thickets near Quitage, sparingly; fl. and fr. March, 1857. No. **1945.**

5. **C. retusa** L. Sp. Pl. edit. 1, p. 715 (1753); J. A. Schmidt, Fl. Cap. Verd. Ins. p. 319 (1852); Baker, *l.c.*, p. 13.

Cape de Verde Islands.—In thin thickets near Villa da Praia, in the island of St. Jago; fl. Jan. 1861. No. **1939.**

6. **C. Welwitschii** Baker in Oliv. Fl. Trop. Afr. ii. p. 13.

Pungo Andongo.—In rather sandy damp pastures between Quibinda and Quitage; fl. without fr. March 1857. No. **1938.**

7. **C. verrucosa** L. Sp. Pl., edit. 1, p. 715 (1753); Baker, *l.c.*, p. 14.

Sierra Leone.—An undershrub, 2 to $2\frac{1}{2}$ ft. high; stems erect or ascending, branched; flowers of a pretty violet-rose colour; sparingly in hilly-bushy grassy places near Freetown; fl. and fr. Sept. 1853. No. **1940.**

8. **C. polygaloides** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 15.

Golungo Alto.—An annual, ashy-green herb, with the habit of a *Polygala*; flowers yellowish, very fugacious; calyx deeply 5-cleft, the two upper lobes larger than the others. On sparingly grassy declivities, among the mountains of Serra de Alto Queta, fl. and fr. April and May 1856. No. **1922.** Flowers yellow. Sparingly, in similar situations; mountains of Quilombo-Quiacatubia; fl. and fr. April 1856. No. **1922*b*.** Herbaceous, a foot high, rigid; leaves trifoliolate; flowers saffron-yellow. In hot situations among crops of *Manihot utilissima*, near Canguerasange; fr. 3 Oct., 1854. Coll. Carp. 461. A glaucescent annual herb; first stem erect; branches ascending; flowers small,

yellow. Habit of *Polygala*. Queta Oriental; fr. May 1856. Coll. Carp. 464.

These specimens from the carpological collection are rather doubtful.

9. **C. cylindrostachys** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 15.

Huilla.—Flowers yellow. In wooded meadows between Eme and Ivantâla; fl. and fr. March and April 1860. No. **1941**.

10. **C. calycina** Schrank Pl. Rar. Monac. fasc. ii. n. 12 (1817); Baker, *l.c.*, p. 15.

Pungo Andongo.—An annual herb, 1 to 1½ ft. high, simple or branched; stem slender, erect, hirsute; leaves simple, linear-lanceolate, hirsute, subcanaliculate, obtusely keeled with a thick midrib, pellucid-punctate throughout, glaucescent beneath; flowers solitary in the axils of the uppermost leaves; calyx deeply bilabiate, concealing the corolla, strigose-pilose outside with long dense hairs; standard and wings straw-yellow; keel whitish-green, fimbriate on the margin. Stamens 10, monadelphous; the 5 alternate ones fertile, shorter than the rest, with erect basifixed anthers having cells a little diverging at the base; the 5 sterile anthers versatile; style naked; pod shorter than the enveloping somewhat accrescent calyx, obovoid-trigonous, very blunt, a little inflated, canaliculate on the vexillary suture; seeds numerous, reniform. Rare, in bushy pasture within the fortress of Pungo Andongo; fl. and fr. middle of Jan. and May 1857. No. **1937**.

11. **C. anthyllopsis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 15.

Pungo Andongo.—In stony pastures, Serra de Pedras de Guinga, at an elevation of 4000 ft.; fl. without fr. March 1857. No. **1943**.

Huilla.—An annual herb; stem patently branched; flowers whitish-yellow, marked with purple-brown veins. In sandy pastures flooded in the rainy season, Morro de Monino, apparently rare; fl. April 1860. No. **1942**.

12. **C. pisicarpa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 16.

Huilla.—An annual much-branched prostrate herb; stems several, 1 to 2 ft. long; leaflets 3, broadly obovate or almost orbicular; flowers yellow; pods globose, as big as a pea; seeds usually 3, reniform. In damp meadows at the banks of the river of Lopollo, on ant-hills and in company with species of *Indigofera*; also in a roadway near Ferrão da Sola; fl. and fr. March and April 1860. No. **1926**.

13. **C. polyclados** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 17.

Huilla.—An annual herb; central stem erect or abortive, the lateral stems prostrate; leaves trifoliolate; standard bright blue, orange-coloured at the base, very broad, scarcely emarginate; wings green-bluish at the apex, orange-coloured on one margin; keel pale-yellow-green; pods turgid; seeds numerous, reniform, rather compressed. Abundant, in elevated stony pastures in the territory of Humpata, in places flooded in the rainy season; at an elevation of 5500 ft.; fl. and fr. 21 March 1860. No. **1951**.

14. **C. spinosa** Hochst. in Herb. Schimp. Abyss. i. n. 150, iii. n. 1540, and in Flora xxiv. I. Intell. p. 32 (1841); Benth. in Hook. Lond. Journ. ii. p. 576 (1843); Baker, *l.c.*, p. 17.

Golungo Alto.—An erect spinous annual herb, but somewhat shrubby; with the habit of an *Ononis*; branches twisted, ascending;

branchlets spinous ; flowers yellow. On the dry slopes of the mountains of Serra de Alto Queta ; fl. and fr. July 1855. On the more elevated slopes of the last ridge of Queta on the right-hand side of the Ambaca road, above Camilungo ; fl. and fr. beginning of June 1856. No. **1906**. An undershrub, like *Ononis*, with yellow flowers and inflated ellipsoidal pods borne on spinous twigs ; Sange ; fr. May 1855. Coll. Carp. 369.

Huilla.—Stems whitish, erect or ascending. In the drier thickets near Lopollo, at the right bank of the river, in company with a dwarf species of Myrtaceæ (cf. Herb. No. 4392) ; fl. and fr. March and beginning of April 1860. No. **1908**.

15. **C. cistoides** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 18.

Pungo Andongo.—Leaflets ranging up to 1 in. long by $\frac{1}{4}$ in. broad. In the wooded pastures, burnt in winter-time, of Serra de Pedras de Guinga ; fl. and fr. March 1857. No. **1928**.

Huilla.—A suffruticose herb, with the habit of a *Cistus* ; stems erect, branched in a broom-like manner ; leaflets 3, sublinear, somewhat hoary (ranging up to $\frac{3}{5}$ by $\frac{1}{6}$ in.) ; flowers yellow, nearly enclosed in the calyx ; keel rather obtusely beaked, greenish-yellow ; standard longitudinally marked with dark purple lines, orbicular, with a subtomentose callus inside at the broad claw ; ovary stipitate, 3-2-ovuled ; pod globose-turgid, usually 2-seeded ; in sandy thickets near the river Monino, in rather dry places in company with species of *Protea* ; fl. and fr. 16 Feb. 1860 ; flowers whitish turning to yellow; Empalanca, April 1860. No. **1923**.

16. **C. caudata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 18.

Pungo Andongo.—An undershrub, 2 to $2\frac{1}{2}$ ft. high, with the stem caudate at the apex ; sporadic, in sandy thickets near Sansamanda ; fl. and fr. April 1857. No. **1933**. A virgate erect undershrub, 2 ft. high, with yellow flowers ; in gravelly situations in Serra de Pedras de Guinga ; fl. Jan. 1857. No. **1944**.

17. **C. variegata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 19.

Huilla.—Root perennial ; stems several, spreading all round, prostrate ; flowers variegated ; keel and wings yellow ; standard deep-violet. In bushy pastures, flooded in the rainy season, only between Lopollo and Jâu ; fl. and fr. end of March 1860. No. **1968**.

18. **C. ervoides** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 19.

Huilla.—Stems several from a woody rootstock, slender, decumbent, quite glabrous as well as the whole plant ; leaflets rigid ; flowers pale-yellow with a tinge of violet. In marshy meadows, dried up at the time of gathering, between Ferrão da Sola and Jâu, in the territory of Lopollo, in company with species of *Trifolium* and *Indigofera* ; with few fl. and with fr. April 1860. No. **1984**. Fr. No. **4154**.

19. **C. abscondita** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 19.

Pungo Andongo.—In stony places near the fortress, rather rare ; fl. and fr. March 1857. No. **1927***b*. Coll. Carp. 536.

Huilla.—An undershrub, 12 to 20 in. high, with the habit of a *Genista* ; flowers small, yellow, almost entirely concealed by the calyx and terminal leaves. In the drier rocky sparingly bushy hilly places from Lopollo in the direction of Jâu, and at Monino ; fl. and fr. end of Jan., March and April 1860. No. **1927**.

20. **C. densicephala** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 21.

Pungo Andongo.—On the grassy slopes of the great rocks of Pedras de Guinga, sparingly; fl. March 1857. No. **1919**.

21. **C. dumetorum** Baker in Oliv. Fl. Trop. Afr. ii. p. 22.

Pungo Andongo.—In the thickets of Mutollo; fl. and fr. April 1857. No. **1920**.

Huilla.—Flowers yellow. In the more elevated wooded meadows of Morro de Lopollo; fl. and fr. Feb. and March 1860. No. **1921**.

This scarcely differs from *C. densicephala*, which Welwitsch regarded as the same species.

22. **C. ononoides** Benth. in Hook. Lond. Journ. Bot. ii. p. 572 (1843); Baker, *l.c.*, p. 22.

Golungo Alto.—A herb 2 to 3 ft. high, quasi-scandent among reeds. In rather dry bushy places in Mata de Mangue, near Sange; fl. June (and a narrow-leaved form in May) 1856. No. **1930**. An ascending herb, 2½ to 4 ft. high, with patent branches and yellow capitate flowers. At the skirts of thickets in higher mountains of Quilombo and above N-dele; fl. March 1855. No. **1930***b*. In exposed hilly situations near Menha-Lula; fl. and fr. April 1856. No. **1931**.

Pungo Andongo.—An annual herb, branched in an ascending manner from the base, with yellow flowers of the habit of an *Anthyllis*. In stony meadows, within the fortress near Calunga; fl. April 1857. No. **1932**.

23. **C. cephalotes** Steud. in Herb. Schimp. Abyss. ii. n. 695 (*U. i.* 1842); A. Rich. Fl. Abyss. i. p. 156 (1847); Baker, *l.c.*, p. 23.

Pungo Andongo.—An annual herb, branched from the base; stem erect; branches ascending; flowers yellowish, small; pods sub-globose. Sparingly, in damp sandy exposed wooded places, between Caghui and Sansamanda, on the way to and at the banks of the river Cuanza; fl. Feb., fr. April and May 1857. No. **1935**.

Huilla.—Flowers yellowish, concealed. In the elevated shortly grassy pastures of Empalanca, flooded in summer, not common; in flower-bud end of March and in April 1860. No. **1936**.

24. **C. nutans** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 24.

Huilla.—A herb, 1½ to 2 ft. high; stem dichotomously branched; leaves trifoliolate; flowers yellow; pods nodding. On the drier slopes between Lopollo and Ferrão da Sola at an elevation of 5500 ft., sparingly; fl. and fr. April 1860. No. **1907**.

25. **C. filicaulis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 24.

Huilla.—Flowers yellowish; calyx similar in structure to that of *C. tenuirama*. In poor pastures near Catumba, where the Monanos, *i.e.* natives from the Nano country, construct their camp; fl. and fr. beginning of April 1860. No. **1982**.

26. **C. tenuirama** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 24.

Pungo Andongo.—Frequent, in coarse sand in the old beds of streams, at an elevation of 3800 to 4000 ft., Serra de Pedras de Guinga; fl. and fr. March 1857. No. **1980**.

Huilla.—Flowers yellow. In the rocky pastures of Serra de Oiaboia; in the territory of Humpata; fl. April 1860. No. **1981**.

27. **C. parvula** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 25.

Huilla.—Flowers greenish-yellow, rather inconspicuous. In exposed grassy places around the great lake of Ivantâla and near Ferrão da Sola ; fl. and fr. Feb. to May 1860. No. **1971**.

28. **C. erythrophleba** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 25.

Huilla.—A pretty annual, nearly 2 ft. high, with branches virgate and as well as the leaves silvery-silky ; wings of the corolla deep-yellow ; standard and keel marked with parallel purple lines. In the more open sandy forests, near Mumpulla, in company with *Alvesia rosmarinifolia* Welw. Herb. No 1636 and with species of *Protea* ; a single specimen ; fl. June 1860. No. **1983**.

29. **C. prolongata** Baker in Oliv. Fl. Trop. Afr. ii. p. 25.

Pungo Andongo.—Sporadic, in grassy places on the banks of the Cuanza near the Calemba islands, along the margins of forests between Condo and Quisonde ; fl. and fr. March 1857. No. **1955**.

30. **C. argyræa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 26.

Mossamedes.—A herb apparently with rather fleshy root which at length turns woody, perennial or at least persisting for several years, glaucescent ; stems ascending, snow-white, finely velvety ; leaves glaucescent ; flowers deep-yellow ; pods puberulous. Sporadic, at the sandy banks of the Rio de Sal along the Serra de Montes Negros ; (also a single specimen near Sacco de Giraûl, in July 1859) ; fl. and fr. 13 August 1859. No. **1972**.

31. **C. ivantulensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 26.

Huilla.—An undershrub, 2 to 4 ft. high ; stems numerous, branched at the apex, copiously blooming. Abundant, in tall-grassy meadows around the great lake of Ivantâla ; fl. and fr. Feb. and March 1860. No. **1975**.

32. **C. ramosissima** Baker in Oliv. Fl. Trop. Afr. ii. p. 26.

Huilla.—Flowers yellow. In wooded meadows near Catumba in the territory of Lopollo ; fl. and fr. March 1860. No. **1973**.

33. **C. amoena** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 26.

Huilla.—Flowers yellow. In the thickets of the drier pastures between Ferrão da Sola and Jâu ; seen by Welwitsch in no other place ; fl. and fr. April 1860. No. **1924**.

34. **C. cordata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 27.

Huilla.—A herb, 2 to 3 ft. high, straight or obliquely ascending ; stipules large, cordate at the apex ; flowers deep-yellow. In grassy woods near the lake Ivantâla, two specimens ; fl. and young fr. Feb. 1860. No. **1917**. Stem and spreading branches subscandent when old ; flowers yellow. Sparingly, in grassy places near the stream of Morro de Lopollo, in company with *Osmunda regalis* L. (Herb. No. 165) ; fl. and fr. April 1860. No. **1918**.

35. **C. versicolor** Baker in Oliv. Fl. Trop. Afr. ii. p. 28.

Pungo Andongo.—An annual herb, 1 to 2 ft. high, branched from the base ; branches elongated, prostrate-ascending ; leaves trifoliolate ; leaflets green, rather thick-fleshy ; calyx herbaceous-green ; standard copper-red outside, violet-blue nearly marine-blue inside ; wings pale-blue ; keel yellowish-green at the base and middle, marked with violet-

purple dots at the apex; pod oblique, $1\frac{1}{8}$ by $\frac{5}{8}$ in. In secondary thickets, in open places, at the right bank of the river Cuanza, near Mapopo; fl. and fr. 21 Jan. 1857. No. **1979**.

36. **C. goreënsis** Guill. et Perrott. Fl. Seneg. Tent. p. 165 (1832); Baker, *l.c.*, p. 28.

Golungo Alto.—A herb, 2 to 4 ft. high or even higher, usually woody at the base and almost an undershrub; stem branched towards the apex; flowers yellow, densely spicate; pods erect; not uncommon in the lower thickets along the rivulets of the Cuango and Quibôlo; fl. and ripe fr. March 1856. No. **1962**. On the most elevated slopes of Quilombo-Quiacatubia, together with Cyperaceæ; fl. and fr. June 1856. A prostrate form. No. **1964**. A herb sometimes erect sometimes prostrate-ascending; leaves subglaucous; flowers yellow; a winter form; on sparingly grassy slopes of the mountains of Serra de Alto Queta, at the left bank of the river Cuango, sporadic; fl. and fr. May and June 1855. Also between Trombeta and Cabondo; fl. and fr. Sept. 1854. No. **1963** (part). An annual leafy herb, 1 to $2\frac{1}{2}$ ft. high; leaves trifoliolate; flowers small spicate. Arimo do Isidro; ripe fr. July 1855. Coll. Carp. 463.

Ambaca.—In bushy shortly grassy situations, from Engombe towards Puri-Cacarambola; fl. Oct. 1856; no specimen separated for the British Museum. No. **1963** (part).

Pungo Andongo.—In hilly sparingly grassy stony places near Sansamanda; fl. April 1857. No. **1963** (part).

Welwitsch's specimens include both the typical form and the β. *angustifolia* of Baker, *l.c.*, p. 29.

37. **C. elata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 29.
C. arborescens Welw. Apont. p. 590, n. 93; non Lam.

Golungo Alto.—An evergreen shrub, 4 to 7 ft. high, with numerous stems, and with the habit of a *Spartium*; branches patent; flowers large; calyx 5-cleft; one lobe appressed to the lower part of the keel; the other lobes approximated in pairs, cohering at the apex in flower, afterwards in fruit free; standard and wings at first of a deep sulphur colour, quickly turning orange-saffron; keel bent upwards at a right angle, persistently sulphur-coloured; pod turgid, oblong-cylindrical, many-seeded, covered with a peculiar densely-hispid tomentum; seeds more or less reniform, rather compressed, orange-saffron. Frequent in thickets and tall-grassy places, but nowhere abundant; about Sange between Capopa and Undale, and in palm groves near the river Cuango; fl. and fr. from Oct. 1854 to July 1855 and in 1856. No. **1911**. Coll. Carp. 133, 368 (without specimen), 385.

Pungo Andongo.—Sparingly, in rocky places, near Mutollo; fl. April 1857. No. **1911***b*.

Huilla.—An undershrub, woody at the base, 2 to 3 ft. high or more, with large yellow flowers; in thickets alongside the streams of Monino, in company with species of *Sesban* (cf. Herb. No. 1995), etc.; fl. end of March 1860. No. **1912**. A shrub 4 to 5 ft. high; pods inflated, oblong- and ellipsoidal-ovoid, white-shaggy. Morro de Lopollo, at the cataracts; fr. April 1860. Doubtfully placed under this species. Coll. Carp. 371.

38. **C. orthoclada** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 29; non Baker in Journ. Linn. Soc. xx. p. 124 (1883).

Huilla.—Flowers yellow. Very abundant at the grassy margins

of the forests between Catumba and Hay, at an elevation of 5500 ft. ; fl. and fr. end of March 1860. No. **1976**.

39. **C. florida** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 30.

Huilla.—Flowers yellow. Abundant in wooded stony hilly meadows about the great lake of Ivantâla ; fl. and fr. Feb. 1860. No. **1925**.

Taubert in Engl. Bot. Jahrb. xxiii. p. 178 (1896) unites this with *C. globifera* E. Mey., which however has shortly stipitate not sessile pods and longer calyx-lobes.

40. **C. senegalensis** Bacle ex DC. Prodr. ii. p. 133; Baker, *l.c.*, p. 31.

Loanda and Barra do Bengo.—A prostrate herb ; root apparently biennial, rather thick, with long fibres and numerous tops, sending off many prostrate or decumbent much-branched branches 3 to 5 ft. long and spreading in a stellate manner ; keel yellow-greenish, falcate-acuminate at a right or almost acute angle ; standard deep-yellow with red lines ; wings yellow. Rather rare, on grassy slopes between Cacuaco and Quicuxe ; fl. and fr. in the winter, beginning of August 1858 ; frequent on grassy hills from Quicuxe to Barra do Bengo, near the small pond at Museque de Quicuxe, March 1854. No. **1913**.

Mossamedes.—An erect or prostrate annual very green herb, with yellow flowers ; frequent along the sandy grassy banks of the river Bero ; fl. and fr. July 1859. No. **1914**.

41. **C. fulgida** Baker in Oliv. Fl. Trop. Afr. ii. p. 32.

Mossamedes.—A copiously flowering plant, cheering the sandy deserts with its brilliant yellow flowers. Amongst brushwood in the damp sandy places, flooded in the rainy season, in Mata dos Carpenteiros, not common ; fl. without fr. August 1859. No. **1977**.

42. **C. lachnocarpa** Hochst. in Herb. Schimp. Abyss. ii. n. 780 ; Baker, *l.c.*, p. 33.

Pungo Andongo.—Stem 2 ft. high ; ripe fruit 1¾ in. long. Sporadic, by moist thickets near Lombe ; fl. and fr. March 1857. No. **1915**.

Huilla.—An erect leafy perennial herb, 1 to 1½ in. high ; flowers racemose-spicate, deep-yellow, soon turning purple ; petals, as well as the leaflets, rather thick and rigid. Sporadic, in the wooded meadows of Catumba in the territory of Lopollo ; fl. and young fr. Dec. 1859. No. **1916**.

Var. **strictissima**.

Leaflets narrower, the central ones ranging up to 2 by ½ in.

Huilla.—Annual ; stem very strict ; flowers large, golden-yellow. Frequent, in wooded meadows between Ferrão da Sola and Jâu in the territory of Lopollo ; a few specimens fl. without fr. end of March 1860. No. 1965.

43. **C. decumbens** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 33.

Pungo Andongo.—On stony declivities alongside streams in the elevated parts of Pedras de Guinga ; sparingly in fl. March 1857. No. **1910**.

Huilla.—A perennial weak decumbent herb, with the flowering branchlets ascending ; flowers yellow ; keel purplish ; in the more elevated grassy places, by the sides of rocks, in Morro de Monino ; fl. April 1860. No. **1909**.

44. **C. uncinata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 33.

Huilla.—A herb, 1½ ft. high ; stem ascending ; corolla yellow ; standard brown-orange ; keel very much bent and acute. In tall-grassy

wooded pastures and meadows, between Ferrão da Sola and Jâu, at an elevation of 5500 ft.; fl. and young fr. March and May 1860. No. **1974**.

45. **C. comosa** Baker in Oliv. Fl. Trop. Afr. ii. p. 34.

Golungo Alto.—Flowers yellow; keel pale-sulphur; standard deep yellow marked with dark-purple lines; in low thickets at the base of the mountains of Serra de Alto Queta; fl. May, fl. and fr. end of July 1855. No. **1959**. A herb, 2 to 3 ft. high, scarcely branched, nearly always with a single stem; flowers yellow, densely spicate; pods in ripening imbricated downwards; not common, on the grassy slopes of the mountains of Serra de Alto Queta, above N-delle; fl. and young fr. beginning of April 1856. No. **1960**. In the wooded meadows of Muangue near N-delle; fl. and young fr. June 1856. A form with the leaflets sub-oval instead of sub-linear. No. **1961**.

Cazengo.—An erect herb, 2 to 3 ft. high, sparingly branched; flowers yellow; in rather dry grassy places, at the skirts of forests, among the mountains of Serra de Muxaûla; fl. and ripe fr. June 1855. No. **1960***b*.

46. **C. natalitia** Meisn. in Hook. Lond. Journ. Bot. ii. p. 67 (1843); Baker, *l.c.*, p. 34.

Pungo Andongo.—In sandy thinly shrubby thickets, between Quibinda and Quitage; fl. March 1857. No. **1970**.

47. **C. protensa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 35.

Pungo Andongo.—A decumbent herb, with stem 2 to 4 ft. long and brilliant yellow flowers. In damp pastures near Condo at the great cataract, and near Quitage; fl. without fr. March 1857. No. **1929**.

48. **C. intermedia** Kotschy in Sitzungsb. Acad. Wien, 1864, p. 362, t. 3; Baker, *l.c.*, p. 37.

Golungo Alto.—In rather damp fields of *Phaseolus* and at the skirts of palm-groves, near Sange and Bango, frequent; fl. and fr. Feb. 1855. On bushy hills near Sange towards Camilungo; fl. and fr. April 1856. No. **1956**. An annual erect branched herb, with yellow flowers; several specimens monstrous, the inflorescence being rendered abnormal by the attack of insects; at the margin of the forest, Sobato Cabanga-Cacalunga; fl. and young fr. beginning of June 1856. No. **1985**.

Ambaca.—In hilly situations near the river Lucala, Oct. 1856; no specimen separated for the British Museum. No. **1958**.

49. **C. Saltiana** Andr. Bot. Rep. x. t. 648 (1811-12); Br. in Salt, Voy. Abyss., App., p. lxv. (1814).

C. striata DC. Prodr. ii. p. 131 (1825); Baker, *l.c.*, p. 38.

Loanda and Barra do Bengo.—An erect herb, 2 to 3 ft. high; branches patent-ascending; keel of the corolla yellowish; wings and standard orange-coloured. Not uncommon, in bushy places along the sea-shore between Barro do Bengo and Cacuaco, fl. end of Sept. 1858; in grassy places near Cacuaco, with few fl. and with ripe fr. Dec. 1853; Praia de Zamba Grande Feb. 1858; July 1854. No. **1953**. Annual and biennial, not rarely suffrutescent; branches patent; leaves pinnately trifoliolate; racemes acute, pyramidal, yellow. In maritime sandy situations at Praia de Zamba Grande; fr. Jan. 1859. Coll. Carp. 370.

Golungo Alto.—An ascending or erect herb, 2 to 4 ft. high; flowers yellow, marked with purple-velvety lines; in moist places at the banks of the river Coango; fl. and fr. May 1855. A herb, occasionally suffruticose, 4 to 6 ft. high, branched towards the apex;

flowers yellow, purple-striate ; in secondary thickets near Canaulo and Camilungo ; fl. and young fr. end of Feb. 1856. Varzea do Isidero, in June 1856. No. **1954**.

50. **C. glaucifolia** Baker in Oliv. Fl. Trop. Afr. ii. p. 38.

Pungo Andongo.—An annual erect herb, 2 to 3 ft. high, with glaucous foliage ; standard cinnamon-coloured outside, deep-violet-blue inside ; wings yellow ; keel saffron-coloured ; immature pod inflated, oblong-cylindrical. In sandy wooded meadows, at the cataract, near Condo, sparingly ; fl. and young fr. 15 March 1857. No. **1934**.

51. **C. Lotononis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 39.

Pungo Andongo.—Habit of a *Lotononis*. Sporadic, in damp sandy places, Sobato Bumba near Condo ; fl. March 1857. A unique specimen. No. **1969**.

52. **C. cyanea** Baker in Oliv. Fl. Trop. Afr. ii. p. 39.

Huilla.—Corolla whitish-green ; standard bright blue. In the elevated pastures of Empalanca, flooded in summer time, at an elevation of 5500 ft. ; in company with species of dwarf Compositæ, *Eriocaulon*, and *Xyris*, scarce ; fl. and fr. end of March and in April 1860. No. **1952**.

53. **C. oligostachya** Baker in Oliv. Fl. Trop. Afr. ii. p. 41.

Pungo Andongo.—Sparingly on the grassy slopes of Serra de Pedras de Guinga, a unique specimen ; fl. Jan. 1857. No. **1957**.

54. **C. axillaris** Ait. Hort. Kew. iii. p. 20 (1789) ; Br. in Tuck. Congo, App., p. 478 (1818).

C. lotifolia Baker, *l.c.*, p. 42 ; non DC.

Ambriz.—(Leaflets oval, the terminal one ranging up to $2\frac{1}{2}$ by $1\frac{1}{4}$ in. ; the lateral ones to 2 by 1 in. ; the petiole ranging up $3\frac{1}{2}$ in.) Flowers mostly 2 together on a very short common axillary peduncle ; pedicels about $\frac{1}{2}$ in. long ; flowers $\frac{2}{3}$ to $\frac{3}{4}$ in. Fruit $2\frac{1}{4}$ by $\frac{3}{4}$ in., subglabrous. In damp sandy hilly places along rocks near the city of Ambriz ; fl. and fr. Nov. 1853. No. **1978**.

55. **C. cleomifolia** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 43.

Pungo Andongo.—A herb, $2\frac{1}{2}$ to $3\frac{1}{2}$ ft. high, annual ?, erect or ascending, branched, without the flowers resembling in habit a *Cleome* ; leaflets 3 to 5, membranous, deep-green and with an oily gloss above, glaucous beneath ; flowers sulphur-yellow, slightly fragrant ; base of the calyx almost circular-flat, oppositely bibracteolate ; bracteoles turned backwards, appressed on the bottom of the calyx towards the insertion of the peduncle ; standard not cordate ; style bearded within towards the apex. In bushy rocky places at Pedra Songue within the fortified lines of Pungo Andongo ; fl. and fr. end of Feb. 1857. No. **1966**.

Huilla.—In wooded grassy places, Catumba near Lopollo ; with yellow fl. and with fr. May 1860. No. **1967**.

4. **TEPHROTHAMNUS** Sweet, Hort. Brit. edit. 2, p. 126 (1830) ; non Sch. Bip. (1863). *Argyrolobium* Eckl. & Zeyh. 1836) ; (Benth. & Hook. f. Gen. Pl. i. p. 480.

1. **T. æquinoctialis.**

Argyrolobium æquinoctiale Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 46.

HUILLA.—An undershrub scarcely a foot high, with numerous erect-patent stems and branches and yellow flowers. In dry shortly-bushy pastures in the Lopollo country; fl. Dec. 1859. No. **2069**.

5. **ADENOCARPUS** DC.; Benth. & Hook. f. Gen. Pl. i. p. 481.

1. **A. benguellensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 47.

HUILLA.—A slender shrub, 2 to 9 ft. high; branches numerous, very patent, twisted, slender, sub-capitate at the apex; leaves $\frac{1}{2}$ in. long; leaflets $\frac{1}{4}$ to $\frac{1}{3}$ in. long, rather obtuse; stipules narrowly lanceolate, but little adnate to the petiole; flowers yellow. On the rocky parts of Morro de Lopollo, up to an elevation of 5000 ft.; fl. and fr. end of March 1860. No. **1897**. A shrub, 2 ft. high, with ascending branches. In stony thickets near Mumpulla, sparingly; fr. Oct. 1859. No. **1897***b*. An arborescent shrub, 7 to 9 ft. high; fr. May 1860. COLL. CARP. 54.

6. **TRIFOLIUM** Tournef., L.; Benth. & Hook. f. Gen. Pl. i. p. 487.

1. **T. polystachyum** Fresen. in Flora xxii. p. 50 (1839); Baker in Oliv. Fl. Trop. Afr. ii. p. 58.

Var. **psoraleoides** (Welw. ms. in Herb.).

A loosely cæspitose perennial herb; stems decumbent-ascending, branched, 1 to 2 ft. long; leaflets oblanceolate-linear, acute or apiculate at the apex, wedge-shaped towards the narrowly rounded base, sharply spinulose-serrate, glabrous, very shortly petiolulate, $\frac{3}{4}$ to $1\frac{1}{8}$ in. long by $\frac{1}{8}$ to $\frac{1}{5}$ in. broad; stipules sheathing for nearly $\frac{1}{2}$ in. the full length of the petiole; spikes of flowers elongate-ovoid, $\frac{1}{2}$ to 1 in. long; calyx-tube $\frac{1}{8}$ in. long, calyx-lobes rather longer, subulate; corolla violet; pods shortly pedicelled.

HUILLA.—Abundant in marshy grassy situations along streams about Lopollo; fl. Nov. 1859, fl. and fr. March and April 1860. No. **1902**.

2. **T. subrotundum** Steud. et Hochst. in Herb. Schimp. Abyss. i. n. 303, and in Flora xxiv. I. Intell. p. 32 (1841); Baker, *l.c.*, p. 59.

Trigonella marginata Hochst. et Steud. in Herb. Schimp. Abyss. i. n. 64; Baker, *l.c.*, pp. 50, 596.

Var. *β.* **obcordatum** Welw. ms. in Herb.

A loosely cæspitose stoloniferous perennial herb; stems decumbent, rooting, the flowering ones sub-erect; leaflets obcordate; heads of flowers axillary, on long peduncles; standard pale-purple; wings and the obtuse keel deep-purple; pods mostly 2-seeded.

HUILLA.—Very abundant in marshy meadows and inundated places throughout the plateau of Huilla; at the banks of the river of Lopollo; fl. Nov. 1859. Around Lopollo and also at the lake Ivantâla; fl. and fr. March and April 1860. No. **1901**. In damp pastures alongside streams near Mumpulla in company with species of Lobeliaceæ (Welw. Herb. Nos. 1144, 1146*b*); fl. Oct. 1859; a comparatively stunted form; No. **1901***b*.

7. **LOTUS** Tournef., L.; Benth. & Hook. f. Gen. Pl. i. p. 490.

1. **L. mossamedensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 62.

MOSSAMEDES.—An annual herb, branched from the base; branches prostrate, spread in a stellate manner; leaves and calyces white-pilose;

flowers of a bright-rose colour ; peduncles 1-2-flowered, supported by a 1-3-foliolate bract ; stipules almost exactly equal to the leaflets and rather to be considered as being the lowest pair of leaflets ; keel subcartilaginous-indurated ; standard obovate-keeled. Very plentiful in moist sandy places, at the banks of the rivers Bero and Giraûl, near their mouths ; fl. and fr. July 1859. No. **1899**.

2. **L. dumetorum** Webb in Herb. Canar. Bourgeau n. 803 (1846) and nn. 1321, 1322 (1855); Lowe, Fl. Madeira, i. p. 176 (1862).

L. arenarius var. *Webbii* Ball in Journ. Linn. Soc. xvi. p. 423 (1878).

Cape de Verde Islands.—In rocky maritime stations in the island of St. Vincent ; fl. Sept. 1853. No. **1898**.

8. **PSORALEA** Royen, L. ; Benth. & Hook. f. Gen. Pl. i. p. 491.

1. **P. obtusifolia** DC. Prodr. ii. p. 221 (1825); Baker in Oliv. Fl. Trop. Afr. ii. p. 64.

Mossamedes.—A prostrate herb, apparently perennial, hoary, with the aspect of a *Medicago*, smells like *Trigonella* ; leaves trifoliolate, strong-smelling when rubbed, at length when dry sweetly aromatic like *Melilotus* ; flowers blue-violet ; calyx sub-campanulate, 5-cleft, the larger lobe opposite the keel ; standard obovate, clawed, embracing the wings and keel ; wings as long as the standard, longer than the keel ; stamens diadelphous ; pod ovate-ellipsoidal, 1-seeded. In sandy moist situations along the banks of the river Bero ; fl. and fr. July 1859. No. **1988**.

2. **P. andongensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 65.

Pungo Andongo.—A perennial herb ; stems several from the thick woody rootstock, erect, a foot high ; leaves simple (or unifoliolate), entire, broadly ovate-elliptical, shortly tomentose beneath, not glandular ; petiole very short ; stipules 2, linear, comose-hispid at the apex, double as long as the petiole ; flowers racemose-capitate, white ; bracts narrow ; bracteoles 2, lying close to the calyx ; calyx tubular, lax ; teeth 5, subequal, as long as the tube, erect, ciliate ; standard oblong, not appendiculate, longer than the appendiculate wings and than the straight not appendiculate petals of the keel ; stamens diadelphous, 9 of them united in a tube cleft above ; ovary 2-ovuled, pilose, subsessile ; stigma thick, capitate, terminating the rather thick style which is incurved at the apex. Very sparingly in the sandy forests of Mata de Panda, composed of *Cussonia angolensis* Hiern, and *Pterocarpus angolensis* DC. ; at the banks of the river Lutete ; fl. 18 Oct. 1856. No. **1987**.

3. **P. bituminosa** L. Sp. Pl. edit. 1, p. 763 (1753); Lowe, Fl. Madeira, i. p. 134 (1862).

Madeira.—In rough maritime situations near Camara dos Lobos ; fl. and fr. August 1853. No. **1989**.

4. **P. americana** L. Sp. Pl. edit. 1, p. 763 (1753); Lowe, *l.c.*, p. 135 (1862).

Madeira.—In damp rocky situations in the Funchal district ; fl. August 1853. No. **1990**.

9. **INDIGOFERA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 494.

1. **I. congesta** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 70.

Anil(a) congesta O. Kuntze, Rev. Gen. Pl. p. 939 (1891).

PUNGO ANDONGO.—A rather hard undershrub, 1½ to 2 ft. high, branched from the base ; leaves impari-pinnate ; leaflets 7, glaucous-green, at length in the dry state hoary-pubescent ; flowers purple-red, crowded in capitate racemes along the branchlets ; calyx 5-cleft nearly to the base ; keel acutely spurred on both sides ; anthers with a long apiculus ; pods ellipsoidal-globose, hardly $\frac{1}{12}$ in. long, with a long apiculus, 1-seeded. Sporadic, in sandy thickets, not far from the river Cuanza, between Condo and Quisonde ; fl. and fr. March 1857. No. **2041**.

2. **I. procera** Schum. et Thonn. Guin. Pl. p. 365 (1827); Baker, *l.c.*, p. 71.

Anil(a) procera O. Kuntze, *l.c.*, p. 939.

AMBACA.—An annual erect herb, resembling *Scoparia* ; branches at first rather strict, at length spreading ; rather rare in moist situations flooded in the rainy season, at the left bank of the river Caringa ; fr. and with a few fl. June 1855. A somewhat shrubby herb questionably perennial, with the habit of a *Thesium* ; root long, thick, woody ; stems oblique, much branched ; leaves simple ; flowers brilliant-red, fugacious ; frequent in bushy wooded places, especially in forests of *Cussonia angolensis* Hiern (cf. Herb. No. 480), between Izanga and N-gombe ; fl. and fr. Oct. 1856. No. **2002**. A perennial, somewhat shrubby herb ; stems virgate, leafy ; flowers flaming-scarlet, fugacious ; pods linear-oblong, cylindrical, hirsute, 2-seeded. In bushy wooded clayey situations ; fl. and fr. Oct. COLL. CARP. 372.

PUNGO ANDONGO.—In exposed shortly grassy parts of forests, abundant, from Calunga in the direction of Muta Lucala ; fl. and fr. March 1857. No. **2001**.

3. **I. simplicifolia** Lam. Encycl. Méth. iii. p. 251 (1789); Baker, *l.c.*, p. 72.

Anil(a) simplicifolia O. Kuntze, *l.c.*, p. 940.

GOLUNGO ALTO.—A slender annual undershrub, rigid, roughish and somewhat ashy all over, 3 to 4 ft. high ; leaves brittle ; flowers white, very small, concealed in the axils of the erect leaves. Frequent in open shortly-bushy places at the margins of forests between Trombeta and Cambondo ; fl. and fr. Sept. 1854. No. **2003**. A strict erect slender undershrub, with the habit of *Lythrum Hyssopifolia* L. ; in moist situations near Cambondo ; fr. 19 Sept. 1854. COLL. CARP. 460.

AMBACA.—A strictly erect annual undershrub, sparingly branched, with a rush-like habit ; leaves erect, appressed, rough ; flowers very small, white ; pods erect, mucronate. In bushy wooded places from Cabinda to N-gombe, in company with various other species of *Indigofera* ; fl. and fr. Oct. 1856. No. **2003***b*.

4. **I. erythrogramma** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 73.

Anil(a) erythrogramma O. Kuntze, *l.c.*, p. 939.

LOANDA.—A summer form ; frequent in sands disintegrated from a red conglomerate, between Alto das Cruzas and Quicuxe ; fl. and fr. Jan. 1854. No. **2007**. Autumn forms ; leaves in the living state marked with purple lines beneath ; flowers scarlet or deep-blood-red ; frequent in hilly sandy places around the city of Loanda, from Alto das Cruzes towards the Museque of Senr. Schut ; fl. and sparingly fr. May 1854. No. **2005**.

PUNGO ANDONGO.—A persisting herb, 1½ ft. high ; flowers brilliantly scarlet-red ; calyx-segments 5, equal, linear, terminated with a capitate

purple gland ; anthers uniform, apiculate. Sparingly in sandy thickets along the margins of forests about the fortress near Sansamanda and near the river Lombe ; fl. and fr. March and May 1857. Near Cazella ; flower-bud Oct. 1856. No. **2006**.

HUILLA.—A herb, apparently persisting for two or several years, very widely cæspitose and quite prostrate ; flowers splendidly scarlet-red. Frequent in damp meadows, along the Catumba stream, by hardened ant-hills ; fl. and very sparingly fr. Jan. and Feb. 1860. No. **2008**.

5. **I. nummularia** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 74.
Anil(*a*) *nummularia* O. Kuntze, *l.c.*, p. 939.

PUNGO ANDONGO.—Rootstock many-headed, woody ; stems 1½ to 2 ft. long, prostrate, much branched ; leaves obovate-orbicular. Common and abundant in sandy places at the river Cuanza, the banks of which it decks with its brilliant rose-purple flowers ; fl. and sparingly fr. Jan. 1857. No. **2009**.

6. **I. capitata** Kotschy in Sitz. Akad. Wien LI. i. p. 365, t. 6A (1865) ; Baker, *l.c.*, p. 75.
Anil(*a*) *capitata* O. Kuntze, *l.c.*, p. 939.

AMBRIZ.—In thickets along the coast to the north of the city of Ambriz ; fl. Nov. 1853. No. **2040**.

7. **I. pulchra** Willd. Sp. Pl. iii. p. 1239 (1800) ; Baker, *l.c.*, p. 76.

LOANDA.—A slender undershrub ; stems densely cæspitose, the central ones erect, the lateral ones ascending, 1½ to 2½ ft. high, virgate, furnished below with pinnate leaves and above with simple leaves ; flowers bright red, fugacious ; calyx in the living state golden-tawny ; frequent and polymorphic in sandy fields to the south of the city of Loanda ; fl. and fr. October 1853 to March 1854 ; Alto das Cruzes, in fruit and with very few flowers at the beginning of December 1858. No. **2010**. A shaded form ; in overhung roadways by their sandy sides among bushes of leafless *Euphorbia*, with a few flowers and fruits in March 1854. No. **2010***b*. 1 to 2 ft. high ; by fences of *Euphorbia* ; fr. Oct. 1853. COLL. CARP. 457.

Var. **andongensis**.
A low spreading undershrub ; leaflets ranging in number up to 9.

PUNGO ANDONGO.—Flowers bright scarlet. Abundant about the fortress in dry thickets near the Luxillo bridge ; fl. April 1857. This plant bears a close resemblance to *I. Brassii* Baker (*l.c.*, p. 76), the leaves of which however have a greater number of leaflets, No. **2047**.

8. **I. pilosa** Poir. in Lam. Encycl. Méth. Suppl., iii. p. 151 (1813) ; Baker, *l.c.*, p. 82.
Anil(*a*) *pilosa* O. Kuntze, *l.c.*, p. 939.

LOANDA.—A slender annual or biennial herb, 1½ to 2 ft. high, with the habit of a *Lotus* ; stems prostrate-ascending from a much-branched base ; flowers very small, rose-coloured or rose-blood-red ; fully ripe pods black. In sandy fields, abundant in the district to the south of the city ; Museque of Luis Gomes ; fl. and fr. July 1858. In tracts of *Fimbristylis*, near Quicuxe ; in fl. and fr. 7 Feb. 1859. No. **2022**. A prostrate annual ; flowers small ; petals deep-purple, very caducous. In sandy places above the city, amongst plantations of *Manihot utilissima* ; fr. April 1854. COLL. CARP. 377.

AMBACA.—Annual, about 4 in. high. In stony places at N-gombe ; in very young fr. June 1857. No. **4149**.

9. **I. heptaphylla** Hiern, sp. n.

An erect slender annual herb, branched from the base often in a virgate manner, pallid, more or less appressedly hairy especially on the leaflets beneath, 9 to 24 in. high or sometimes more ; leaves imparipinnate, 2-4-jugate, usually 3-jugate, 1 to 3 in. long ; lateral leaflets opposite or sub-opposite, sub-linear or narrowly oval-oblong, rounded with a short apiculus at the apex, rounded or somewhat narrowed at the very shortly petiolulate base, entire, $\frac{1}{3}$ to 1 in. long, $\frac{1}{20}$ to $\frac{1}{5}$ in. broad ; terminal leaflet similar, ranging up to $1\frac{1}{3}$ in. long, on a petiolule ranging up to $\frac{1}{4}$ in. ; stipules subulate, small ; stipels 0 ; racemes axillary, 1 to 4 in. long, many-flowered ; common peduncle (below the first flower) $\frac{1}{4}$ to $2\frac{1}{2}$ in. ; flowers rose-purple, clustered along the upper part of the rachis especially towards the apex, $\frac{1}{4}$ in. long ; pedicels very short, shorter than or about equalling the lanceolate-subulate deciduous bracteoles ; calyx $\frac{1}{12}$ in. long, clothed with appressed whitish hairs, lobes subulate from an ovate or lanceolate base, about as long as or a little longer than the tube ; corolla glabrous ; standard obovate, $\frac{1}{4}$ in. long, exceeding the staminal slit tube ; pods more or less spreading or declining, shortly and appressedly hairy or sub-glabrate, 1 to $1\frac{2}{3}$ in. long, $\frac{1}{12}$ in. broad, somewhat compressed, slightly turning upwards near the apex, otherwise straight ; seeds 12 to 16.

This species resembles more or less *I. parviflora* Hayne, *I. goniodes* Hochst., and *I. costata* Guill. & Perr. ; it differs from the first by longer peduncles and from the others by fewer leaflets and different calyx-lobes. It differs also in habit from *I. linearis* Guill. & Perr. which Baker in Oliv. Fl. Trop. Afr. ii. p. 83 unites with *I. parviflora* ; *I. linearis* DC. Prodr. ii. p. 228, from Senegambia, not mentioned by Baker, is the same as *I. aspera* Perr.

LOANDA.—Here and there in grassy places on poor soil between Penedo and Conceicão ; fl. and fr. May 1858. No. **4146**. Fl. No. **4145**.

AMBACA.—On the left bank of the river Caringa, in grassy places ; fl. and fr. June 1855. No. **4147**. In fields near N-gombe ; fl. and fr. Oct. 1856. No. **4148**.

PUNGO ANDONGO.—At the salt mine near Quibinde Quitage ; fr. March 1857. No. **4143**. A branched annual herb, 3 to 4 ft. high, with pretty purplish flowers. In grassy places at the sides of thickets near the stream Cagalulé ; fl. Jan. 1857. More robust than the type, and perhaps a distinct species. No. **4144**.

10. **I. Welwitschii** Baker in Oliv. Fl. Trop. Afr. ii. p. 84.
Anil(a) Welwitschii O. Kuntze, *l.c.*, p. 940.

PUNGO ANDONGO.—A very slender, erect or ascending, annual herb, 3 to 18 in. high ; leaves 1-, 3-, or 5-foliolate ; flowers scarlet or rose-purple, very fugacious ; keel acuminate ; style very short, consisting of a gibbous waxy-glandular body seated on the apex of the ovary o which the oblique shortly penicillate stigma is attached, and which

persists at the apex of the pod. Frequent, in the rather elevated shortly-grassy meadows of Pedra de Cabondo, about Sansamanda; in fl. and fr. April 1857. No. **2066**. A slender annual herb; stems ascending; flowers scarlet, turning purple when dried: pods straight, $\frac{2}{3}$ to $\frac{7}{8}$ in. long; $\frac{1}{12}$ in. wide. In the moist meadows of Sansamanda, at the banks of the river Cuanza. In fl. and fr. end of April 1857. No. **2066***b*. On the grassy slopes of Pedras de Guinga; in fl. beginning of April 1857. No. **2066***c*. A small annual herb, sometimes erect, at other times with prostrate stems, 3 to 6 in. high, heterophyllous; the earliest lower leaves oval, $\frac{1}{2}$ by $\frac{1}{4}$ in.; upper leaves 3-5-foliolate; leaflets narrowly elliptical or nearly linear, $\frac{1}{3}$ to $\frac{2}{3}$ by $\frac{1}{15}$ to $\frac{1}{6}$ in.; flowers rose-coloured, rather small, never all fully expanded at once; pods (young) linear, hirsute, moderately falcate or somewhat arched, apiculate with the curved style. On the stony dry highest ranges of the fortress near Pedra de Cazella; fl. and young fr. towards the end of May 1857. No. **2067**.

Huilla.—A little hispidulous annual herb, a hand high; stem branched; branches rather spreading; lower leaves simple, upper leaves and those of the branches trifoliolate; flowers bright scarlet, very fugacious; pods narrowly ensiform, many-seeded. In marshy pastures and alongside streams near Lopollo, especially about Catumba at the camp of the Munanos; fl. and fr. 27 March 1860. No. **2032**. In moist meadows at the left bank of the river of Lopollo, in company with *Iphigenia guineensis* Baker (Welw. Herb. No. 1626); fl. violet-red and fr. April 1860. No. **2031**.

11. **I. psilostachya** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 84. *Anil(a) psilostachya* O. Kuntze, *l.c.*, p. 939.

Huilla.—A very bright-green herb, 2 to 4 ft. high; primary stem cylindrical; branches and branchlets sub-compressed, angular, one or other angle almost winged; the lower branches elongated, ascending; flowering spikes elongated, 6 to 15 in. long, erect-patent; flowers at first blue, soon turning violet. In moist wooded meadows along the river Mupanda, near the great lake Ivantâla; fl. and young fr. Feb. 1860. No. **2052**.

12. **I. medicaginea** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 86. *Anil(a) medicaginea* O. Kuntze, *l.c.*, p. 939.

Pungo Andongo.—A tender prostrate perennial herb, with the habit of a *Medicago*; leaves trifoliolate; leaflets beset beneath with thin rigid hairs fixed on the midst of the lamina; flowers reddish-purple; calyx-teeth all equal; stamens diadelphous, the vexillary one free; keel not spurred; anthers with a very small hardly perceptible apiculus; style obsolete; stigma large, sessile, orbicular, ciliate. In moist meadows with short herbage, by the banks of the river Cuanza near Sansamanda, apparently rare; fl. and with two young fr. Feb. 1857. No. **2025**. An annual or biennial prostrate little herb; some leaves simple, others pinnately trifoliolate, the end-leaflet orbicular; flowers scarlet. Sparingly, in the moist poorer meadows with short herbage by the stream of Catete within the fortress of Pungo Andongo; fl. and young fr. May 1857. No. **2026**.

13. **I. oxalidea** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 86. *Anil(a) oxalidea* O. Kuntze, *l.c.*, p. 939.

Huilla.—A perennial herb; stems thin, flexuous, prostrate; leaves 3-5-foliolate, deep-green; flowers purple-scarlet. In damp muddy-

sandy meadows, about ant-hills, between Lopollo and Monino ; fl. and fr. April 1860. No. **2023**.

14. **I. trita** Linn. f. Suppl. Pl. p. 335 (1781) ; Baker, *l.c.*, p. 86.
Anil(a) trita O. Kuntze, *l.c.*, p. 940.

Loanda.—A herb, apparently annual or biennial ; primary stem rather erect ; branches oblique or decumbent, more or less distichously branched ; leaves and stem beset with rigid brittle stinging hairs ; flowers brick-red, fugacious. Occasionally in dry rocky and sandy maritime stations at Praia da Zamba Grande ; fl. and young fr. 16 Jan. 1859. No. **2028**. A prostrate herb, with ascending branchlets ; whole plant whitish-silky in the living state ; flowers of a brilliant cinnabar-red colour. On clay flooded in summer time, between Quicuxe and Cacuaco ; fl. and fr. beginning of August 1858. No. **2028***b*. A suffrutescent herb ; stem as well as the trifoliolate leaves beset with stinging hairs ; branches quite patent ; Jan. 1859. Coll. Carp. 376.

Golungo Alto.—Stems ascending, 2 to 4 ft. long ; flowers of a pale-violet colour, very caducous. At the borders of thickets and by roadsides in stony and gravelly places, between Trombeta and Cambondo ; fl. and young fr. March 1855. No. **2029**. A herb becoming woody at the base ; branches virgate, prostrate-ascending ; leaves glaucous-green ; flowers few, vinous-brick-red. Garden of the Residency of Golungo Alto, in cotton-plantations ; fr. 1 Oct. 1856. Doubtfully referred to this species. Coll. Carp. 373.

Ambaca.—An annual herb, branched from the base ; branches elongated, sarmentose ; leaves trifoliolate, as well as the stem beset with stinging hairs ; flowers pale-lilac, when first opened scarlet. Among fields of *Manihot utilissima* Pohl, near N-gombe ; fl. and ripe fr. Oct. 1856. No. **2030**. Puri Cacarambola ; fl. Oct. 1856. A poor doubtful specimen. No. **4135**.

Pungo Andongo.—An annual herb, well simulating in habit a *Melilotus* ; stem ascending, branched in a virgate manner towards the apex ; leaflets 3 to 5. In bushy sparingly grassy meadows between the river Lombe and Muta Lucala ; fl. and young fr. March 1857. No. **2027**.

Mossamedes.—Not uncommon in fields of *Gossypium* about Cavalleiros ; fl. and young fr. August 1859. No. **2068**.

15. **I. benguellensis** Baker in Oliv. Fl. Trop. Afr. ii. p. 87.
Anil(a) benguelensis O. Kuntze, *l.c.*, p. 938.

Mossamedes.—Leaflets not uncommonly opposite and alternate in the same specimen. In sea-sands, not far from the ocean, near Porto Pinda, at Cabo Negro ; in young fl. and fr. Sept. 1859. No. **2061**.

16. **I. paucifolia** Delile, Fl. Egypte, p. 251, t. 37 fig. 2, 2′, Ill. p. 70 (1812) ; Baker, *l.c.*, p. 88.
Anil(a) paucifolia O. Kuntze, *l.c.*, p. 939.

Benguella.—A little shrub with ascending white-glaucescent stems : leaves very glaucous beneath, green-glaucous above ; flowers at first red, almost cinnabar-red, soon turning violet. In sandy thickets near the city of Benguella ; fl. and fr. June 1859. No. **2019**.

Mossamedes.—A little evergreen shrub, hard-woody at the base, 3 to 5 ft. long, very glaucous throughout ; stems numerous, prostrate-ascending, loosely branched ; leaflets alternate ; flowers small, red, fugacious ; pods torulose. Frequent, in sandy places along the banks of the river Bero ; fr. with a few fl. 11 August 1859. No. **2018**.

17. **I. hirsuta** L. Sp. Pl. edit. 1, p. 751 (1753); Baker, *l.c.*, p. 88.
Anil(a) hirsuta O. Kuntze, *l.c.*, p. 160.

Ambriz.—Frequent, in dry open bushy places in the forest, between Ambriz and Banza de Ambriz ; fl. and fr. Nov. 1853. No. **2054**.

Golungo Alto.—An annual herb (also suffruticose, and lasting 2 or 3 years), 2 to 3 ft. high, erect or decumbent, clothed with hairs, which not rarely but not always sting ; flowers scarlet ; in moist thickets, borders of Mata de Quisucula ; fl. May 1856. No. **2055**. Sange, at the base of Serra de Alto Queta ; fr. June 1856. No. **2055***b*.

Var. *β*. **polystachya** Welw. ex Baker, *l.c.*, p. 89.

Pungo Andongo.—A herb, 1½ ft. high, with spreading branches from the base. In sandy places along thickets, between Lombe and Quibinda, by roadsides, flooded in the rainy season ; fl. March 1857. No. **2056**.

Huilla.—Erect. In wooded meadows with tall herbage ; at the skirts of forests, in company with various species of *Crotalaria*, *Cracca*, and *Ampelocissus*, about the great lake Ivantâla, nowhere abundant ; fl. and young fr. end of Feb. 1860. No. **2065**. Decumbent or ascending ; spikes distant ; flowers violet-purple. In sandy meadows by forests composed of species of *Protea* and *Eugenia*, near Monino ; fl. beginning of Feb. 1860. No. **2065***b*.

Var. *γ*. **pumila** Welw. ex Baker, *l.c.*, p. 89.

Huilla.—Suffruticose; rootstock thick, woody, many-headed; stems much branched from the base ; leaflets orbicular-elliptical, secund ; flowers violet-purple. In the more elevated stony shortly-bushy pastures, between the great lake Ivantâla and Quilengues ; in young fl. beginning of Feb. 1860. No. **2057**.

18. **I. astragalina** DC. Prodr. ii. p. 228 (1825); Baker, *l.c.*, p. 89.

Bumbo.—Serra da Xella. In fields after the cultivation of *Arachis hypogœa* L. ; not common ; fl. and fr. Oct. 1859. No. **2021**.

19. **I. alternans** DC. Prodr. ii. p. 229 (1825); Baker, *l.c.*, p. 89.
Anil(a) alternans O. Kuntze, *l.c.*, p. 938.

Mossamedes.—On sandhills, among species of leafless *Euphorbia* and *Zygophyllum*, rather frequent, near the city of Mossamedes ; fl. and fr. end of June 1859. No. **2059**. Flowers rose-red. On the sea-sands at Praia da Amelia ; fl. August 1859. No. **2058***b*.

Var. *β*. **macra** Baker, *l.c.*

Mossamedes.—Flowers violet-purple. On sea-sands near "As hortas," along the banks of the river Bero, near its mouth ; fl. and fr. July 1859. No. **2058**.

20. **I. maritima** Baker in Oliv. Fl. Trop. Afr. ii. p. 89.
Anil(a) maritima O. Kuntze, *l.c.*, p. 939.

Mossamedes.—A prostrate, very widely cæspitose, glaucous-silky, perennial herb, with the habit and colour of foliage like those of *Medicago maritima* L. ; leaflets fleshy, thick ; flowers blood-red. Frequent and polymorphic, on sea-sands near the city of Mossamedes ; fl. and fr. July 1859. No. **2061***b*.

21. **I. heterocarpa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 90.
Anil(a) heterocarpa O. Kuntze, *l.c.*, p. 939.

Huilla.—A prostrate ascending bright-green perennial herb or

undershrub, much branched at the base; rootstock thick woody; branches ascending, with close branchlets; flowers small, scarlet or red-scarlet; pods sometimes short ovoid and 1- or 2-seeded, sometimes on the same stem, oblong-linear and several-seeded. In elevated rather dry shortly grassy pastures, at an elevation of about 5400 ft., in Morro de Lopollo; fl. and fr. Feb. 1860. No. **2051**.

22. **I. setiflora** Baker in Oliv. Fl. Trop. Afr. ii. p. 90.
Anil(*a*) *setiflora* O. Kuntze, *l.c.*, p. 940.

Huilla.—A little shrub, with ascending reddish branches; flowers red-lilac, rather fugacious. Sporadic, in exposed grassy somewhat sandy places, at the borders of forests, by the road from Ferrão da Sola towards Jâu, in the Lopollo territory; fl. April 1860. No. **2020**.

23. **I. mimosoides** Baker in Oliv. Fl. Trop. Afr. ii. p. 90.
Anil(*a*) *mimosodes* O. Kuntze, *l.c.* p. 939.

Pungo Andongo.—In sandy shortly bushy pastures, between Quibinde and Quitage, sparingly; fl. March 1857. A unique specimen. No. **2046**.

Huilla.—Flowers violet-coloured, much smaller than in *Indigofera phyllanthoides* Baker (No. 2044); pods straight, rather hairy, erect-patent. In shortly grassy pastures, in company with various Labiatæ; in Morro de Lopollo; fl. and fr. end of March 1860. No. **2045**.

Ambriz.—Fl. and fr. Nov. 1853. Poor specimens, perhaps belonging to this species, and also very like *I. viscosa* dam. No. **4151**.

24. **I. subcorymbosa** Baker in Oliv. Fl. Trop. Afr. ii. p. 91.
Anil(*a*) *subcorymbosa* O. Kuntze, *l.c.*, p. 940.

Huilla.—A slender, erect, distantly branched shrub, 2 to 4 ft. high, with the habit of a *Coronilla*; leaflets 5 to 7, tender; flowers scarlet, soon turning brick-red. In rocky sparingly bushy places, among ferns and shrubs, along the base of the mountains of Morro de Lopollo; fl. Dec. 1859. No. **2053**.

25. **I. rhynchocarpa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 92.
Anil(*a*) *rhynchocarpa* O. Kuntze, *l.c.*, p. 939.

Pungo Andongo.—A robust suffruticose herb, 2 to 4 ft. high and more, woody at the base, with the habit of *Galega officinalis* L.; stem straight, branched, flowering towards the apex; branches erect-patent; leaflets 7 to 9, coriaceous, obscurely green, rather glossy, glaucescent beneath; pilose hairs fixed on the middle of the lower surface of the leaflets; calyx and standard greenish outside; keel whitish; wings rose-coloured; standard embracing the half shorter wings and the equally long keel; petals of the keel much cohering in front, after flowering thrown off with elasticity together with the standard and wings. Stamens diadelphous, the vexillary filament geniculate at the base; anthers aristate-mucronate; style filiform, bent at the apex in a rectangular manner; stigma narrowly capitate; pod cylindrical, reddish, sub-torulose, pendulous from the much-thickened pedicel, $1\frac{1}{2}$ to $2\frac{2}{3}$ in. long, straight but incurved, clavate-capitate and mucronate at the apex. In thickets with tall herbage about Catete, not far from the fortress; fl. and unripe fr. 10 Jan. 1857; with ripe fr. April 1857. No. **2015**.

Huilla.—An erect glaucescent undershrub, $1\frac{1}{2}$ to 2 ft. high; pod clavate-thickened at the apex. In bushy wooded places between Catumba and Hay; fr. April 1860. No. **2017**.

This species occurs also at Caconda, where it is called "Ubangó" or "Ubange"; it was gathered by Anchieta in Nov. 1877, n. 137.

26. **I. pruinosa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 93.
Anil(a) pruinosa O. Kuntze, *l.c.*, p. 939.

Mossamedes.—An erect hard small shrub, 2 ft. high; stem and branches completely covered with a glaucous branny bloom; leaves imparipinnate; leaflets 5 or 7, fleshy, rigid, covered with a rough pubescence, very brittle; flowers purple; calyx widely gaping at the back, all the teeth being directed forwards; standard sub-orbicular, with two spots at the base; keel not spurred; anthers subulate-apiculate; pod sub-cylindrical, 1½ in. long, glabrous. Sporadic, in rocky mountainous places, along the banks of the river Maiombo; in young fl. and in fr. Oct. 1859. No. **2035**.

27. **I. daleoides** Benth. ex Harv. in Harv. & Sond. Fl. Cap. ii. p. 200 (1862); Baker, *l.c.*, p. 95.
Anil(a) daleodes O. Kuntze, *l.c.*, p. 939.

Benguella.—Stems numerous from a woody many-headed rootstock, prostrate in all directions, slender, 1½ ft. long or more. On sea-sands, especially at the mouth of the river Cavado, near the city of Benguella; fl. June 1859. No. **2060**.

28. **I. microcarpa** Desv. Journ. Bot. iii. p. 79 (1814); Benth. in Mart. Fl. Bras. xv. i. p. 39 (1859).
I. enneaphylla Baker, *l.c.*, p. 95; non L.

Loanda.—An annual or biennial herb; branches long, much branched at the base, procumbent, or rather stretched out in a stellate manner; petals white at the claw, violet on the lamina; pods cylindric-conical, short, few-seeded. Plentiful, in a few places by drying-up pools near Alto das Cruzes; fl. and fr. May 1854 and 12 July 1858. No. **2011**. In dried-up pools, near Boa Vista; fl. and fr. July 1858. No. **2011***b*.

Our specimens differ from *I. enneaphylla* L. by opposite, not alternate, leaflets; by longer racemes and by sub-torulose and darker pods; they nearly agree with the Brazilian *I. microcarpa* Desv., especially with its synonym *I. domingensis* Spreng. ex DC. Prodr. ii. p. 227 (1825), but the flowers are slightly larger, and the leaflets oblanceolate and longer.

29. **I. endecaphylla** Jacq. Collect. Bot. ii. p. 358 (1788), Ic. Pl. Rar. t. 570 (1786-93) (*hendecaphylla*); Baker, *l.c.*, p. 96.
Anil(a) endecaphylla O. Kuntze, *l.c.*, p. 939.

Ambriz.—Frequent in sandy places along the sea-coast between Mossul and Ambriz; fl. and fr. Nov. 1853. A small-leaved form. No. **2063**.

Loanda.—Annual, sometimes persisting for several years; stems prostrate, 3 to 5 ft. long; frequent, in grassy hollows, flooded in the rainy season, and in dried-up Represas around the city of Loanda, near Boa Vista, Quicuxe, Alto das Cruzes, etc.; fl. and fr. Feb. to July 1858. No. **2062**. A prostrate perennial; stems numerous, woody at the base; flowers brick-red, arranged in long spikes, Cacuaco and Morro das Lapostas; fr. August 1854. Coll. Carp. 110.

Pungo Andongo.—A perennial herb; rootstock woody, vertical, many-headed; stems prostrate; leaflets glaucous-green, rather fleshy; inflorescence much-acuminate; flowers violet-purple; sporadic on stony shortly-grassy hills within the fortified lines of Pungo Andongo; fl. and fr. April 1857. A form with narrow leaflets. No. **2064**. A

glaucous-green perennial herb ; rootstock thick, woody ; stems numerous, prostrate ; leaves glaucous, pinnate ; leaflets 5 to 7, alternate ; stipules 2 together, scarious, adnate to the petiole ; flowers pale reddish-yellow ; calyx deeply cleft, with narrow acuminate teeth ; petals of the keel with a short obtuse almost spathulate spur ; anthers apiculate, very small ; pod compressedly tetragonal, crenate at the sutures between the seeds. In exposed stony shortly-grassy moist parts of the fortress, near Catete ; fl. and young fr. May 1857. No. **2024**.

Huilla.—Stems 2 or more from a thick woody several-headed rootstock, herbaceous, erect, branched ; leaflets glaucous ; flowers purplish. Rather rare, in wooded thickets between Lopollo and Monino, at an elevation of 5000 ft. ; fl. end of March 1860. A form with large leaflets. No. **2014**.

Var. **radicans** Welw. ex Baker, *l.c.*

Pungo Andongo.—Lombe Quibinde ; fl. No. **4150**.

Huilla.—Herbaceous ; stems several from the many-headed root, ½ to 2 ft. long, prostrate in all directions, much branched, rather rigid, brittle, rooting at the base ; leaflets 3 to 5, nearly glabrous ; flowers purple-lilac. Sporadic, in moist meadows by ant-hills composed of red sand, in company with *Hydrocotyle*. Between Lopollo and Monino ; fl. and nearly ripe fr. April 1860. No. **2039**.

30. **I. phyllanthoides** Baker in Oliv. Fl. Trop. Afr. ii. p. 96.
Anil(a) phyllanthodes O. Kuntze, *l.c.*, p. 939.

Huilla.—A slender undershrub, 2 to 3 ft. high, above with slender branchlets ; older branches purple ; flowers violet-coloured, less fugacious than in most species of the genus. In the drier thickets, between Nene and the high plateau of Empalanca ; fl. and young fr. April 1860 ; at an elevation of 5400 ft. No. **2044**.

Taubert in Engl. Pflanzenw. Ost—Afr. c, p. 210 (1895) unites this name with *I. dendroides* Jacq.

31. **I. subulifera** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 96.
Anil(a) subulifera O. Kuntze, *l.c.*, p. 940.

Pungo Andongo.—In sandy places at the skirts of forests near Sansamanda ; fl. and fr. April 1857. No. **2048**. An erect herb, 1½ to 2½ ft. high, ashy-pubescent throughout ; leaflets 7 to 11 or 12, opposite, as well as the pod terminated with a subulate acumen at the apex. Abundant in exposed rocky forests, near Calunga and between it and Candumbo ; fl. and fr. May 1857. No. **2048***b*. In shortly bushy pastures, near the river Cuanza, between Condo and Quisonde ; fl. March 1857. No. **2049**.

Huilla.—Abundant, in grassy shortly-bushy places, along the skirts of woods between Catumba and Hây ; fl. March 1860. No. **2050**. In the drier thickets at the skirts of woods near the great lake Ivantâla, with pale-blue fl. (a young plant without fl. near Eme in Jan. 1860, not separated for the British Museum), end of Feb. 1860. No. **2050***b*.

32. **I. Anil** L. Mant. Pl. alt. p. 272 (1771) ; Welw. Apont. p. 574 under n. 174 ; Baker, *l.c.*, p. 98.
Anil(a) tinctoria ϵ *vera* O. Kuntze, *l.c.*, p. 160.

Prince's Island.—Frequent, sandy maritime places and drier hills, about Porto S. Antonio, etc. ; fl. and fr. Sept. 1853. No. **2034**.

Loanda.—An undershrub, 1½ to 3½ in. high or even higher and nearly shrubby ; stems crowded, suberect or oblique ; flowers incon-

spicuous, reddish, very fugacious ; standard as well as the keel yellowish-green ; wings bright brick-red ; pods subtorulose. Frequent and spontaneous, but scarcely indigenous, in clay-sandy exposed rather dry hilly situations around Loanda and Cacuaco ; fl. and fr. June and July and also in Nov. 1858. No. **2033**. Spontaneous almost everywhere in open uncultivated places throughout the district, but scarcely indigenous ; fr. 27 Nov. 1858. Coll. Carp. 375.

Golungo Alto.—Common, in the drier thickets near Sange ; fl. and fr. April 1855. No. **2037**.

The species grows spontaneously along the coast from Ambriz as far as the mouth of the river Cuanza, but in all probability it was originally introduced for the production of indigo.

33. **I. umbonata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 98.
Anil(a) umbonata O. Kuntze, *l.c.*, p. 940. *Indigofera* (sp.), Welw. Apont. p. 588, n. 50.

Pungo Andongo.—A small rigid shrub, 2 ft. high, with glaucous foliage and habit of *I. tinctoria* L. ; pods straight, obtusely quadrangular, glabrous, umbonate at the apex, with a thick ring below the acumen. In rocky shortly-bushy places, between Caghuy and Calunga, rather rare ; fl. and ripe fr. March 1857. No. **2038**. An undershrub, 3 to 4 ft. high, much branched. Frequent in sandy thickets between Condo and Quisonde ; fr. March 1857. Used by the natives for dyeing cloth. Coll. Carp. 374.

34. **I. emarginella** Steud. in Herb. Schimp. Abyss. ii. n. 735, et iii. nn. 1723, 1893 ; A. Rich. Tent. Fl. Abyss. i. p. 184 (1847) ; Baker, *l.c.*, p. 99.
Anil(a) emarginella O. Kuntze, *l.c.*, p. 939.

Pungo Andongo.—A suffruticose herb, 3 to 4 ft. high, resembling in general aspect a species of *Amorpha* ; branches, leaves, and peduncles densely setulose ; flowers whitish with bright reddish wings. At the skirts of forests near Condo, between the waterfall and Bumbo ; only one specimen seen in fl. March 1857, in company with species of *Protea* and Thymelæaceæ. No. **2016**.

35. **I. macrophylla** Schum. Guin. Pl. p. 372 (1827) ; Baker, *l.c.*, p. 100.
Anil(a) macrophylla O. Kuntze, *l.c.*, p. 939.

Pungo Andongo.—An erect, much-branched undershrub, 5 to 7 ft. high, with many stems ; flowers red, variegated with green. Abundant, in thickets growing on a ferruginous-argillaceous soil, near Quibange, not far from the fortress of Pungo Andongo ; fl. Jan. 1857, at an elevation of 3500 ft. No. **2013**.

36. **I. dendroides** Jacq. Ic. Pl. Rar. iii. t. 571 (1786—1793) ; Jacq. Coll. ii. p. 357 (1788) ; Baker, *l.c.*, p. 100.
Anil(a) dendrodes O. Kuntze, *l.c.*, p. 939.

Golungo Alto.—A slender much-branched herb or undershrub, 2 ft. high, with a broom-like ramification ; branchlets rather patent ; general appearance of a species of *Phyllanthus*. Sporadic, on the more elevated sparingly-grassy slopes of the mountains of Serra de Alto Queta ; fl. and young fr. 19 March 1856. No. **2043**.

37. **I. viscidissima** Baker in Oliv. Fl. Trop. Afr. ii. p. 100.
Anil(a) viscidissima O. Kuntze, *l.c.*, p. 940.

Huilla.—An erect herb, with several stems from a woody rootstock

very densely beset nearly all over with stalked glands, and very viscid; flowers at first scarlet, soon turning purple, very fugacious. Sporadic, along the bushy skirts of forests composed of *Parinari*, near Cazenda; fl. without ripe fr. beginning of April 1860, at an elevation of 5000 ft. No. **2042.**

38. **I. sutherlandioides** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 101.

Anil(a) sutherlandiodes O. Kuntze, *l.c.*, p. 940.

Huilla.—A herb, the most beautiful of the genus in Angola, with the habit of a *Sutherlandia* ; rootstock woody, persisting ; stems erect, 1 to 2 ft. high ; flowers dark-purple ; calyx short, cup-shaped, 5-toothed, teeth deltoid ; standard very shortly clawed ; wings much shorter than the ample keel, which is shortly and obtusely spurred on both sides ; anthers acutely apiculate ; pods sub-compressed, glabrous, dark-purple, $1\frac{2}{3}$ in. long, transversely septate. On rocky, rather dry, and sparingly bushy hills above Ferrão da Sola ; fl. Jan. 1860. Also in wooded bushy places near the great lake of Ivantâla, between it and Quilengues ; fr. end of Feb. 1860. No. **2012.**

Occurs also at Caconda, where it was gathered by Anchieta in Oct. 1880.

39. **I. anabaptista** Steud. Nomencl. Bot., edit. 2, i. p. 805 (1840).

I. Hochstetteri Baker, *l.c.*, p. 101. *Anil(a) Hochstetteri* O. Kuntze, *l.c.*, p. 939. *A. anabaptizata* O. Kuntze, *l.c.*, p. 938.

Loanda.—Frequent in both dry and moist sandy places ; leaves 3- or 5-foliate ; flowers sometimes viviparous. Morro das Lagostas ; fl. Jan. 1854, fr. Feb. Boa Vista ; fl. and fr. 10 August 1854. No. **4137.** Fl. and young fr. Nov. 1858. No. **4138.** Fl. and fr. No. **4139.** An annual herb ; stem and branches prostrate-ascending ; the adult plant furnished with stinging hairs ; pods much compressed. Abundant, in the very dry sandy sparingly grassy parts of Praia de Zamba Grande ; fl. 16 Jan. 1859. Morro das Lagostas ; fr. March 1856. No. **4140.** An elongated form with elongated interrupted racemes, in poor fl. and fr. No. **4141.**

Mossamedes.—A prostrate herbaceous-green annual herb, with small bright blood-red fugacious flowers, in sandy places near the river Bero; fl. and fr. beginning of July 1859. An annual herb, with stems spread in an orbicular manner and pale violet flowers, in sandy sparingly grassy places by the river Bero, near Quipola ; rare fl. and fr. August 1859. A unique specimen with root woody as thick as the little finger, stems $1\frac{1}{2}$ ft. long spread out into a circle, and pale violet flowers ; in sandy places of the river Caroca near Cabo Negro, in a pit nearly dried up, in company with *Hyphaene benguellensis* Welw. and a species of *Arundo* ; fl. and fr. Sept. 1859. No. **4142.**

40. **I. aspera** Perr. ex DC. Prodr. ii. p. 229 (1825); Baker, *l.c.*, p. 102.

Anil(a) aspera O. Kuntze, *l.c.*, p. 938.

Mossamedes.—A bright-green herb ; stem and leaves rather rough; flowers rose-red ; pods flattened. In damp sands near the mouth of the river Giraûl ; fl. and young fr. July 1859. No. **2036.** An annual herb, apparently, if adult, prostrate ; stem, as well as the trifoliolate leaves, rather rough ; flowers scarlet, when dried blue-purple. In moist sandy places at the banks of the river Bero ; fl. 14 August 1859. No. **2036***b*.

There is another *Indigofera* in the collection, perhaps a new species, represented by imperfect specimens:—

Ambaca.—An undershrub, about 9 in. high, with the habit of a *Lotus*; stem much branched, hard and woody at the base; leaves pinnate, hoary-silky (fruit $\frac{3}{4}$ to $1\frac{1}{8}$ in. long, linear, slightly hairy outside, turning black, straight, erect or ascending, on short pedicels, arranged in axillary racemes 1 to 2 in. long, exceeding the leaves). In fields near N'gombe; fr. Oct. 1856. No. **4136**. Coll. Carp. 391.

10. **SYLITRA** E. Mey.; Benth. & Hook. f. Gen. Pl. i. p. 496.

1. **S. angolensis** Baker in Oliv. Fl. Trop. Afr. ii. p. 103.

Huilla.—An erect slender rather rigid undershrub, 1 ft. high; stem and branches niveo-tomentellous, flexuous at the nodes; leaves subpinnately (almost or quite digitately) trifoliolate; stipules subulate; leaflets linear-lanceolate, pallid, rather rigid, glabrous above, hoary-strigulose but soft to the touch beneath; flowers axillary, solitary, very shortly pedunculate, small, yellow, bibracteolate; calyx tubular-campanulate, cleft two-thirds way down in a bilabiate manner, upper lobes connate higher up than the others, all acuminate, almost as long as the tube; petals all clawed; standard obovate-spathulate, narrowed gradually from the middle into the claw, longer than the keel, about equalling or a little exceeding the wings; wings narrow, auriculate, longer than and scarcely adhering to the moderately incurved erostrate keel; stamens all connate in a tube cleft above; anthers uniform, rather small, congregated around the capitate stigma; ovary shortly and rather broadly stipitate; style rather short, a little curved, nearly glabrous, gradually narrowed towards the stigma; pod oblong, compressed, membranous, 4-6-seeded; seeds separated by very thin septa. In gravelly places by the river Maiombo; one specimen fl. and fr. June 1860. No. **4124**.

11. **CRACCA** L. Fl. Zeyl. p. 139 (1747); L. Sp. Pl. edit. 1, p. 752 (1753); non Medic. nec Benth. *Tephrosia* Pers. (1807); Benth. & Hook. f. Gen. Pl. i. p. 496.

1. **C. acaciæfolia** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia acaciæfolia Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 106.

Pungo Andongo.—An erect undershrub, 3 to 4 ft. high, with purple flowers. At the sandy margins of forests between Bumba and Condo, in company with a species of *Protea*; fl. and young fr. March 1857. No. **2071**.

2. **C. melanocalyx** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia melanocalyx Welw. ex Baker, *l.c.*, p. 106.

Huilla.—Rootstock thick, many-headed, perennial; stems prostrate in all directions; branches ascending; leaves (phyllodia) simple, rather glabrous; flowers in the living state brilliantly scarlet. On rich grassy somewhat sandy and stony meadows, along the borders of forests in the neighbourhood of Proteaceæ, on the road from Lopollo to Monino; fl. and young fr. Dec. 1859. No. **2072**.

3. **C. lævigata** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia lævigata Welw. ex Baker, *l.c.*, p. 107.

Huilla.—Perennial; stems prostrate-ascending, slender, with

crowded small branches ; leaves trifoliolate or, especially those of the top-branches, simple ; leaflets with cartilaginous margins ; flowers pale-purple. On grassy shortly-bushy hills in the Lopollo country from Ferrão da Sola in the direction of Jâu ; in young fl. and fr. beginning of April 1860. No. **2074**.

4. **C. lupulinifolia** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia lupinifolia DC. Prodr. ii. p. 255 (1825); Baker, *l.c.*, p. 107.

Ambriz.—On the drier sea-sands, between Ambriz and Mossul ; not yet in full fl. Nov. 1853. No. **2076**.

Var. **digitata** (*T. digitata* DC., *l.c.*).

Loanda.—Calyx-teeth from an ovate base gradually subulate-acuminate ; standard nearly orbicular, emarginate, not appendaged ; upper filament free at the base and at the base of the anther, adhering at the middle ; ovary linear-oblong, 6-8-ovuled : at Teba Feb. 1854. On sandy hills between Teba and Cacuaco ; fl. and fr. Feb. 1854. No. **2077**.

This species supplies the blue dye of the negroes of the Congo, according to Dr. Daniell.

5. **C. disperma** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia disperma Welw. ex Baker, *l.c.*, p. 108.

Mossamedes.—An annual silky-hoary herb; stems slender, branched, several from the same crown of the root, prostrate in all directions ; stipules subulate ; leaves pinnate, usually 7- more rarely 9-foliolate ; the lower leaflets gradually smaller, the old terminal one twice as long as any of the others, broadly linear, all apiculate ; peduncles leaf-opposed or the earliest ones almost radical, ranging up to 1 ft. in length, very slender, bearing distant flowers ; pedicels capillary, two together in the axil of a subulate bract, a little longer than the flowers; flowers purple, small, very fugacious ; calyx-teeth subequal, acuminate; standard orbicular, pubescent outside, embracing the wings and petals of the keel, with a short rather broad almost deltoid claw ; vexillary stamen quite free, adhering to the claw of the standard ; anthers globose, versatile, uniform ; ovary sessile, silky-pilose, 2-ovuled ; style flattened, scarcely cartilaginous, nearly naked, bent at the apex together with the thinly papillose stigma ; pods about $\frac{1}{2}$ in. long, rather compressed, attenuate at the base, obliquely beaked at the apex, 2-seeded, seeds transversely oblong, sculptured. On sand-hills along the sea-coast, between Praia da Amelia and Cabo Negro ; fl. and fr. 8 July 1859. No. **2095**.

6. **C. capillipes** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia capillipes Welw. ex Baker, *l.c.*, p. 108.

Loanda.—An annual herb, erect or sometimes decumbent or ascending, somewhat silky-hoary, very soft and pretty flaccid ; stems slender, oblique or diffuse ; branches spreading, slender ; leaflets both in the living and dried states shining with a silvery gloss ; flowers rose-purple, usually only the lower ones of the racemes well developed, the upper ones being poor or quite sterile. Very common, on grassy hills and in rather poor exposed fields around the city of Loanda ; fl. and fr. from Dec. to April and May ; Imbondeiro dos Lobos Dec. 1853 ; Alto das Cruzes Jan. and March 1854 ; Museque de Luiz Gomes in May 1858. No. **2094**.

7. **C. Vogelii** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia Vogelii Hook. fil. ex Hook. f. & Benth. in Hook. Niger Fl. p. 296 (1849); Welw. Apont. p. 586 n. 28 (1859); Baker, *l.c.*, p. 110; Ficalho, Pl. Uteis, p. 130 (1884).
T. inebrians Welw. Apont. p. 573, sub n. 174, 9ª.

Golungo Alto.—A shrub, 4 to 9 ft. high, or occasionally a small very elegant tree 7 to 9 ft. high, with slender trunk naked at the base and rather broad crown; branches rather patent, crowded, elongated; flowers sometimes milk-white, at other times brilliant violet-purple; pods straight, pendulous, of two colours when young, brown-tomentose. The leaves when a little bruised are thrown into the rivers to stupefy fish; the fish caught in this manner are wholesome. In sandy thickets throughout the district especially between Trombeta and Cambondo, and in other places near Sange, and by crops in Sob. de Mussengue; also occasionally cultivated for catching fish; fl. and fr. Sept. 1854 and Jan. and May 1855. Native name "Cafoto." No. **2092**. Coll. Carp. 379.

Pungo Andongo.—A very beautiful little tree or tall shrub. Spontaneous and cultivated throughout nearly the whole district. Spontaneous near the cataract of Condo; fl. and fr. March and April 1857. Native name "Calembe." No. **2093**. Coll. Carp. 154 and 380.

8. **C. rigidula** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia rigidula Welw. ex Baker, *l.c.*, p. 112.

Huilla.—A suffruticose herb, rigid and firm throughout; stem straight or obliquely sub-flexuous; leaflets 7 to 15, acute or obtuse and mucronate; racemes leaf-opposed or quasi-terminal; flowers violet-coloured; pods pilose. In rather bushy pastures with tall herbage at Varzeas de Catumba; fl. and fr. May 1860. No. **2106**.

9. **C. barbigera** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia barbigera Welw. ex Baker, *l.c.*, p. 113.

Golungo Alto.—An ascending annual herb, 1 to 4 ft. high; calyx densely pilose, the lower tooth twice as long as the rest and on the lower surface bearded with usually longer very crowded hairs which are directed downwards; petals very caducous; standard brown-tomentellous outside, purplish inside; wings brilliantly purple; keel whitish at the back, pale-violet in other parts. Frequent but not abundant on tall-grassy slopes of the mountains of Serra de Alto Queta, in company with species of *Gladiolus* and Hypoxideæ; fl. and young fr. March 1856. No. **2096**.

Pungo Andongo.—An annual herb, 2 to 3 ft. high, erect or ascending; the angular stem, the branches and petioles as well as the pods softly shaggy; flowers brilliant purple-violet. In the dry exposed sandy parts of forests near the cataract of Condo of the river Cuanza; fl. and nearly ripe fr. March 1857. No. **2097**.

Var. (?) **Bakeriana**.
Tephrosia nana, var. *β. angolensis* Baker, *l.c.*, p. 110.

Pungo Andongo.—An annual herb, erect or mostly ascending at the base; flowers violet-coloured; pods shaggy-velvety, thickened at the black margin, about 12-seeded. In sandy pastures at the banks of the rivulet Luxillo, behind the fortress, rather sparingly; fl. and fr. April 1857. No. **2100**. Welwitsch regarded this as an autumn form of No. 2096.

10. **C. oxygona** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891) (*oxygera*).
Tephrosia oxygona Welw. ex Baker, *l.c.*, p. 114.

Mossamedes.—An erect undershrub, 3 to 4 ft. high, dispersedly and sparingly branched, with glaucous indumentum and habit nearly of *Indigofera*; stem cylindrical; leaflets 15 to 21, obovate-cuneate, emarginate, rather fleshy in the living state; stipules broadly lanceolate; racemes elongated, usually a foot long, leaf-opposed and quasi-terminal; rachis very acutely 2- or 3-angular, occasionally sub-alate, 2-edged; flowers violet-purple. In sandy thickets along the banks of the river Bero; fl. and young fr. beginning of August 1859. No. **2104**.
A perennial rock-herb or undershrub, 1 to 2 ft. high, decumbent, glaucous-pruinose throughout, hard, slightly fleshy, brittle; stems several from a thick rootstock, oblique or decumbent, acutely angular above, hoary-pruinose with highly appressed hairs; stipules linear-lanceolate, rather thick; leaflets about 7, oblanceolate-oblong, $\frac{1}{2}$ to $1\frac{1}{2}$ by $\frac{1}{5}$ to $\frac{1}{3}$ in.; pod (unique) recurved-subfalcate, $2\frac{1}{2}$ in. long, $\frac{1}{8}$ in. broad, scattered with short appressed hairs. Rare, at the red-sandy rocks called Boca do Rio Bero; ripe fr., the older and longer stems (2 ft.) already dead, July 1859. Determination doubtful. No. **2110**.

11. **C. secunda** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia secunda Welw. ex Baker, *l.c.*, p. 115.

Pungo Andongo.—An erect undershrub, 3 to 4 ft. high; stem somewhat angular; leaflets secund in the living state, narrowed at the base; bracts lanceolate-subulate; flowers violet-coloured; in wooded sandy meadows between Condo and Quisonde; fl. and young fr. March 1857. No. **2107**. In sandy places with tall and scattered bushes near Banza do Soba Quitage; with ripe fr. and sparingly fl. March 1857. No. **2108**.

12. **C. bracteolata** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia bracteolata Guill. et Perr. Fl. Seneg. Tent. (i.) p. 194 (1832); Baker, *l.c.*, p. 116.

Cazengo.—Flowers violet-coloured; standard purple; wings transversely rugose. In sandy-stony places with scanty bush, on poor soil, between Caculo and Dalatanda, at an elevation of about 1800 ft.; sparingly fl. and in young fr. June 1855. No. **2109**.

13. **C. andongensis** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia andongensis Welw. ex Baker, *l.c.*, p. 116.

Pungo Andongo.—An erect undershrub, 2 to 3 ft. high, with purple flowers. In sandy thickets on the right bank of the river Cuanza, between Condo and Quisonde; fl. March 1857. No. **2070**.

14. **C. dimorphophylla** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia dimorphophylla Welw. ex Baker, *l.c.*, p. 116.

Huilla.—A herb, 3 ft. high; stem erect or oblique; branches elongated, patent-ascending, usually 2 ft. long; leaves sometimes simple, sometimes on one and the same branch trifoliolate; flowers dark-purple. In the wooded meadows of Monino, but observed in only one place; fl. end of March 1860. No. **2073**.

15. **C. elegans** O. Kuntze, Rev. Gen. Pl. i. p. 175.
Tephrosia elegans Schum. Guin. Pl. p. 376 (1827); Baker, *l.c.*, p. 118.

Golungo Alto.—An erect silky-white undershrub, 2 to $2\frac{1}{2}$ ft. high;

lower leaves 5-foliolate, upper leaves 3-foliolate ; flowers sessile, yellowish, at first whitish. On the grassy drier slopes of the higher ranges of the mountains of Serra de Alto Queta, but only in a few places ; fl. and unripe fr. end of March 1856. No. **2086**.

Pungo Andongo.—In the thickets of sandy woods between Lombe and Quibinda ; fl. and young fr. March 1857. No. **2088**.

16. **C. dasyphylla** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia dasyphylla Welw. ex Baker, *l.c.*, p. 118.

Pungo Andongo.—In the exposed sandy parts of forests near Sansamanda : fr. May 1857. Unique specimen. A narrow-leaved form. No. **2085**.

Huilla.—A perennial herb ; rootstock very thickly woody ; stems erect, simple or with spreading branches ; leaves trifoliolate, rarely 5-foliolate, thick but not fleshy ; flowers violet-coloured. Not uncommon, in bushy sandy-stony rather dry places, in the descent from Morro de Lopollo in the direction of Ferrão da Sola, in company with *Clematis chrysocarpa* Welw. (Herb. No. 1222) ; fl. and fr. April 1860. No. **2084**. Morro de Lopollo, towards Humpata, in sparingly bushy places ; fl. and fr. April 1860. No. **2084***b*.

17. **C. cephalantha** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
Tephrosia cephalantha Welw. ex Baker, *l.c.*, p. 119.

Pungo Andongo.—Stem erect, flexuous ; flowers violet-coloured, at first whitish, few together in a head. On grassy slopes at the foot of the Serra called Pedras de Guinga ; fl. and fr. end of March 1857. No. **2089**.

Huilla.—An elegant erect undershrub, 1 to 1½ ft. high ; leaflets 3 to 5; stipules acute, spreading, turning black; flowers violet-coloured, crowded at the extremities of the stem and branches. In bushy stony (mica schist) rather elevated places in Morro de Lopollo ; fl. and ripe fr. April 1860. No. **2087**.

Var. *β.* **decumbens** (Welw. ex Baker, *l.c.*).

Huilla.—A little undershrub, patently branched from the several-headed rootstock, 6 in. high ; branches sub-decumbent ; stipules from a broad base with a long almost subulate acumen ; flowers pale-violet. Sparingly, on rather dry shortly-bushy hills, from Ferrão da Sola in the direction of Jâu, gathered while reconnoitring ; fl. and fr. end of March 1860. No. **2090**.

18. **C. linearis** O. Kuntze, Rev. Gen. Pl. i. p. 175.
Tephrosia linearis Pers. Syn. Pl. ii. p. 330 (1807); Baker, *l.c.*, p. 120.

Ambriz.—An erect undershrub, 2 to 3 ft. high, virgately branched above ; leaflets usually 5 ; flowers violet-coloured. On stony wooded hills on the road from Mossul to Libongo, when fleeing from negro-robbers; fl. and ripe fr. Nov. 1853, at an elevation of about 300 ft. No. **2101**.

Golungo Alto. Without special locality or notes. Leafy branch. No. **4152**.

19. **C. longipes** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia longipes Meisn. in Hook. Lond. Journ. Bot. ii. p. 87 (1843); Baker, *l.c.*, p. 120.

HUILLA.—A suffrutescent slender herb, 2 ft. high. Stipules rigid, setaceous, persistent, ¼ in. long; leaflets 3 to 9, opposite, narrowly linear, rather rigid, narrowed toward both ends, mucronate, shortly petiolulate, 1½ to 3¾ in.; common petiole ranging up to 1⅔ in.; racemes axillary and terminal, pedunculate or sessile, 6 to 18 in. long (including the peduncle), angular; bract small and setaceous or the lower ones sometimes foliaceous; pedicels equalling the calyx; upper calyx-teeth setaceous, equalling or longer than the tube; corolla ½ in., violet-coloured; style bearded; pods 2½ to 3 in. long, nearly straight, shortly tomentose; seeds 9 to 11. Frequent in the shortly bushy parts of the forest between Catumba and Hay, but at the time of gathering almost entirely destroyed by sheep; a few specimens fl. and fr. April 1860. No. **2105**.

20. **C. radicans** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia radicans Welw. ex Baker, *l.c.*, p. 121.

HUILLA.—A perennial herb, with aspect of a *Medicago*; rootstock thick, many-headed; stems 2 to 3 ft. long, prostrate, much branched, rooting; flowers purple; pods broadly oblong, ½ in. long, 2- or few-seeded. In damp meadows, about the mounds formed by a large kind of ant, near Varzeas de Catumba; fl. and fr. April 1860. No. **2082**.

21. **C. huillensis** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia huillensis Welw. ex Baker, *l.c.*, p. 121.

HUILLA.—A decumbent-ascending undershrub; stems flexuous; internodes usually rather distant; leaves 3-5-jugate; petioles 1 to 1½ in. long; stipules broadly lanceolate, elongate-acuminate, persistent; racemes terminal or in the axils of the upper leaves; bracts like the stipules, comose when young, persistent; flowers violet-coloured. In bushy pastures near Nene; fl. Oct. 1859, fr. Feb. 1860. No. **2102**.

Var. *β.* **grandiflora** (Baker, *l.c.*).

HUILLA.—Pod more densely shaggy. In wooded meadows around the great lake of Ivantâla, along the road leading to Quilengues; fl. and fr. end of Feb. 1860. No. **2103**.

22. **C. paniculata** O. Kuntze, Rev. Gen. Pl. i. p. 175 (1891).
Tephrosia paniculata Welw. ex Baker, *l.c.*, p. 122.

PUNGO ANDONGO.—A herb, 2 to 3 ft. high, very patently branched; leaflets 5 or 7, elongate-elliptical, velvety on both sides; flowers purple; racemes axillary, crowded, arranged in a panicle. In stony places with tall herbage, near Mupopo, at the river Cuanza, in company with *Dolichos elatus* Welw. Herb. No. 2075*b*. Not at all common; fl. April 1857. No. **2075**. Quitage forests; fl. No. **4114**.

23. **C. villosa** L. Sp. Pl. edit. 1, p. 752 (1753).
Tephrosia villosa Pers. Syn. Pl. ii. p. 329 (1807); Baker, *l.c.*, p. 122.

Var. **incana** O. Kuntze, Rev. Gen. Pl. i. p. 174 (1891).
T. incana Graham in Wall. List, n. 5644; Baker, *l.c.*, p. 123.

LOANDA.—An annual suffrutescent herb, 2 to 3 ft. high, silvery-silky, very beautiful, sometimes forming a large undershrub; branches spreading; leaflets in 6 to 8 pairs, with an odd one; flowers deep violet-purple. Mostly soon decaying without leaving a trace behind. In grassy places around stagnant pools full in summer and drying up in winter, above the city of Loanda; Museque Schut, etc.; fl. April to June 1858 and with abundance of ripe fr. No. **2091**.

24. **C. coronilloides.**

Tephrosia coronilloides Welw. ex Baker, *l.c.*, p. 123.

Pungo Andongo.—An undershrub, 2 to 2½ ft. high, branched in a distorted manner, with the habit of a *Coronilla* ; flowers bright scarlet, fugacious ; frequent, in sandy bushy places on the right bank of the river Cuanza, near Sansamanda ; fl. middle of Dec. 1856, fl. and fr. May 1857. No. **2080**.

Bumbo.—In fields after cultivation of *Arachis hypogœa* L., on a sandy soil of mica-schist, near Bumbo, at the base of the mountains of Serra da Xella ; fr. and sparingly fl. Oct. 1859. No. **2081**.

25. **C. decora.**

Tephrosia decora Welw. ex Baker, *l.c.*, p. 123.

Pungo Andongo.—A suffruticose herb, sometimes annual, or an undershrub ; stem erect, 1½ ft. high, simple at the base, flexuous and with spreading branches above, densely and patently shaggy ; leaflets 7 to 13, almost like leaves of *Ledum*, bright green and densely striate above, silvery-silky beneath ; stipules filiform-subulate from the base, ¼ in. long ; bracts filiform ; flowers violet-coloured ; calyx-teeth subulate, twice as long as the tube, spreading ; racemes almost strigulose. In bushy places at the margins of forests between Lombe and Candumba, plentiful only in one spot ; fl. and young fr. March 1857. No. **2098**.

26. **C. drepanocarpa.**

Tephrosia drepanocarpa Welw. ex Baker, *l.c.*, p. 124.

Huilla.—A prostrate or decumbent, perennial herb, with the habit of a *Vicia* ; stems elongated, decumbent-ascending ; flowers rose-purple, sometimes dark purple ; upper teeth of the calyx connate rather high ; standard orbicular, silky outside ; vexillary stamen free at the base and at the apex ; sheath of the filaments minutely auriculate on both sides at the base ; style flattened, subcartilaginous ; pod subfalcate. In exposed sandy pastures, inundated at the time of gathering, about ant-hills ; frequent, from Lopollo towards Catumba and Ferrão da Sola ; fl. and nearly ripe fr. Jan., Feb., and April 1860. No. **2083**.

27. **C. purpurea** L. Sp. Pl. edit. 1, p. 752 (1753).

Tephrosia purpurea Pers. Syn. Pl. ii. p. 329 (1807) ; Baker, *l.c.*, p. 124.

Pungo Andongo.—In shortly bushy rather sandy pastures on the right bank of the river Cuanza, near Mupopo ; fl. and young fr. Dec. 1856. No. **2099**.

Var. *β.* **pubescens** (Baker, *l.c.*, p. 125). *T. lineata* Schum. & Thonn. Beskr. Guin. Pl. p. 376 (1827).

Loanda.—An erect herb, branched from the base ; branches at length elongated, patent-decumbent ; flowers red ; frequent along roadsides and in sandy hilly fields from Alto das Cruzes as far as Quicuxe ; fl. and fr. Feb. and April 1854. No. **2078**. A biennial (?) herb ; stem branched from the base ; branches more or less prostrate-ascending and as well as the leaves hoary-silky ; flowers small, purplish or rose-purple. Frequent, in sandy spaces near the city of Loanda to the south, Museque de Luiz Gomes ; fl. and fr. June 1858. No. **4131**. Flowers rose-purple ; in the grassy thickets of Boa Vista ; Feb. 1858. Possibly belonging to this variety, but perhaps a different species. No. **4130**. An undershrub or a prostrate apparently annual herb ; stems 1½ to 3 ft., bright brown and white-striate ; branches spreading,

very crowded, at length almost nodding; branchlets ascending; flowers solitary or very rarely two together, axillary, at first yellowish-white, afterwards violet-purple, in time nearly red; pods secund; the whole plant hairy with soft spreading hairs, only appressed on the lower surfaces of the leaflets; rather rare, in dry sterile sandy maritime rocky places, at Praia de Zamba Grande; fl. and fr. 16 Jan. 1859. Doubtfully placed here, but may be a distinct species; it differs from the usual character by the short and axillary inflorescence and by the more tomentose pod. No. **4133**. An erect much-branched shrub, 1½ to 3 ft. high; branches patent, herbaceous; leaves imparipinnate, silky; flowers sessile or subsessile, violet-purple; pods constantly secund. In rocky maritime stations at Praia de Zamba Grande; fl. and fr. 1 Jan. 1859. Agrees with No. 4133. Coll. Carp. 381. A herb; root persisting for several years; stems prostrate, branched; branchlets ascending; flowers white, more rarely purplish; calyx, especially on the face of the linear-elongated segments, furnished with long pilose hairs; pods more pilose than in the variety with purple flowers; promiscuously with the variety referred to, in sandy bushy places near Maianga de El Rei; fl. and fr. end of Dec. 1858. No. **4132**. A herb; rootstock many-headed, perennial (?); stems prostrate-ascending, woody-tenacious and purplish at the base, much branched; flowers purple; very abundant in sandy shortly-bushy hills throughout the Loanda country, especially near Maiongo de El Rei; fl. and fr. end of Dec. 1858. No. **4132***b*. A prostrate-ascending herb; flowers rose-coloured. At Maiango do Povo; fl. and fr. June 1858. In some specimens of this the racemes are axillary, very short and with few flowers. No. **4134**.

Ambaca.—A prostrate herb, apparently annual or biennial. In fields of *Manihot utilissima* Pohl, near N-gombe; fr. and very few fl. Oct. 1856. No. **2079**.

12. **MUNDULEA** Benth.; Benth & Hook. f. Gen. Pl. i. p. 497.

1. **M. suberosa** Benth. in Miq. Pl. Jungh. p. 248 (1852); Baker in Oliv. Fl. Trop. Afr. ii. p. 126.

Mossamedes.—A small tree, 8 to 10 ft. high, patently branched: flowers violet-purple, arranged in conical racemes. Sparingly in thickets at the banks of the river Bero, near Cavalheiros; in late fl. and in fr. beginning of June 1859. No. **1844**. An arborescent shrub or small tree, with the habit of a *Sophora* or *Millettia*: flowers violaceous, spicate-racemose; pod linear, stipitate, compressed, occasionally constricted, tomentose. In sandy thickets at the banks of the river Bero, in company with thorny plants; fr. July 1859. Coll. Carp. 468.

13. **MILLETTIA** Wight & Arn.; Benth. & Hook. f. Gen. Pl. i. p. 498.

1. **M. Griffoniana** Baill. in Adans. vi. p. 222 (1866).

M. Thonningii Baker in Oliv. Fl. Trop. Afr. ii. p. 128. *Phaseolodes Thonningii* O. Kuntze, Rev. Gen. Pl. i. p. 202 (1891).

Golungo Alto.—A small tree, 10 to 20 ft. high, with the habit of a *Fraxinus* or *Robinia*, evergreen; trunk tortuous, 9 to 12 in. in diam.; crown rather lax; leaves odd-pinnate; leaflets moderately coriaceous but rigid, glossy above, pale-subglaucous beneath; flowers of a deep-rose colour, inodorous, arranged in axillary cylindric-clavate, nodding, obtuse, gradually acuminate racemes longer than the leaves; calyx

brown-black outside, whitish with purple lines inside ; corolla violet-coloured ; standard broadly obcordate, with a rather broad channelled claw which is sinuous-plicate at the base of the lamina ; wings with two unequal feet at the base, adhering to the keel ; petals of the keel combined ; stamens 10, 5 taller than the rest, diadelphous, all fertile, the vexillary one free and geniculate at the base ; ovary sessile, linear, rather compressed, pilose, many-ovuled ; style glabrous, bent at a right angle above ; stigma penicillate-capitate, yellow. On the slopes of the mountains between Bango and Quilombo Quiacatubia ; fl. May and June 1855 ; in the secondary woods in the direction of the river Luinha (when a shrub rarely flowering) ; sparingly in fl. June 1856 ; fr. Sept. and Jan. 1855. Cf. Lichen n. 201*b*. No. **1860**. A small tree, very rarely as much as 25 ft. high, usually 15 to 20 ft. high, not rarely a shrub of 6 ft., but then not flowering ; crown very frondose, dilated ; branches spreading, the lower ones very much so ; flowers very bright violet-purple ; pod $7\frac{3}{4}$ in. long by $1\frac{1}{3}$ broad. Sporadic, in the primitive forests of the lower mountains of Queta Central ; also on the bushy slopes of Alto Queta towards the river Luinha ; fl. July 1856, in nearly ripe fr. Oct. 1855. One of the most beautiful plants of the family. Cf. Fungus n. 223. No. **1861**.

Cazengo.—A small tree with an ample crown. A sort of "Mutalamenha." At the margins of woods, between the left bank of the river Luinha and Serra de Muxaûlo ; fl. June 1855. No. **1862**.

Baillon, *l.c.*, describes the calyx as quite glabrous, but in our specimens it is somewhat velvety. Thonning describes the pedicels as bibracteolate at the middle instead of the base, and the standard as silky-pubescent outside instead of glabrous.

The following No. should be compared with this species :—

Loanda.—An erect shrub, 5 to 6 ft. high, with numerous stems (or the fresh growth of a mutilated tree ?). In thickets on a poor soil, between Quicuje and Mutollo, sporadic ; leafy branchlets without fl. May 1854. No. **1848**.

2. **M. drastica** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 128 ; Ficalho, Pl. Uteis, p. 132 (1884).

Phaseolodes drasticum O. Kuntze, *l.c.*, p. 202.

Golungo Alto.—A small tree, 7 to 15 ft. high, or oftener a shrub of 6 to 8 ft., with ample crown and habit of a *Fraxinus* ; wood very strong and sturdy, employed for making excellent [char-]coal ; leaves glaucous ; flowers of a pale or deep violet colour ; pods effectually and promptly purgative when the decoction is taken in a tepid state. Native names "Ditenda" or "Quitenda" or "pseudo-Moçumba." In high thickets and in the more open woods at the margins of streams, around Canguerasange, Quilombo, Bango, etc., rather common ; fl. Oct. 1854 and March 1855, fr. 3 Jan. 1855 and Sept. 1856. No. **1856**. A small tree, 10 to 15 ft. high, or in secondary thickets a shrub of 6 to 8 ft., very elegant, with patent and rambling branches ; flowers of a deep violet-rose colour, turning to purple when older ; rachis of the racemes rigid. On the rather dry bushy slopes of the mountains of Serra de Alto Queta, between Zengas and Carrengue ; fl. August 1855. No. **1856***b*. Sange, at the Residency ; fr. A form with acute leaflets. A decoction of the pods is used as a drastic purge. Coll. Carp. 382. A bush, with racemose-paniculate purplish-rose flowers ; at the Residency, fr. Sept. 1856. Coll. Carp. 466.

Cazengo.—A small much-branched tree, 8 to 10 ft. high, or in secondary thickets a shrub ; leaflets glaucescent ; racemes elegant,

crowded, 5 to 12, at the extremity of the branches ; flowers of a violet colour. On high-bushy slopes of the mountains of Serra de Muxaûlo ; fl. June 1855. Native names "Mutala menha" and "Mutala-menha và ofele." No. **1857**.

Pungo Andongo.—A small tree ; trunk scarcely 3 in. in diameter ; crown dilated ; branches patent ; rachis of the racemes thick, very rigid ; flowers lilac-purple, handsome. In the rocky secondary woods of the fortress, near Catete, not frequent ; fl. Jan., fr. April 1857 ; "pseudo-Quisecúa." No. **1858**.

3. **M. gracilis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 129. *Milletia* (sp.), Welw. Synopse, p. 46, n. 126, *pro parte* (1862). *Phaseolodes gracile* O. Kuntze, *l.c.*, p. 202.

Golungo Alto.—A small tree rarely if ever 8 to 10 ft. high, usually a shrub of 3 to 6 ft., with a more slender habit than usual in this genus ; rachis of the racemes very slender ; flowers violet-coloured ; corolla sometimes rather small, at other times nearly double the size. Sporadic, in the higher thickets of the mountains of Serra de Alto Queta ; fl. March 1855. No. **1854**. An erect shrub, 5 ft. high ; at Capopa, at the margins of forests ; without fl. June 1856. No. **1854***b*.

Ambaca.—A small tree 8 to 12 ft. high, or in secondary thickets a little shrub of 2 to 3 ft., erect, elegant ; crown hemispherical ; leaves deciduous at the time of flowering ; leaflets glaucous-green ; flowers of a deep violet-rose colour. In thickets at the skirts of the forests of Praia Cacarambola, and around Pamba (N-gombe) and Zanga, also near Cabinde ; fl. middle of Oct. 1856 ; in leaf and young fr. June 1857 ; fr. Sept. 1856 ; at an elevation of 3000 ft. Always sporadic. No. **1855**.

4. **M. versicolor** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 129 ; Ficalho, Pl. Uteis, p. 132 (1884).

Robiniacea, Welw. Synopse, p. 15, sub n. 37 (1862). *Phaseolodes versicolor* O. Kuntze, *l.c.*, p. 202.

Golungo Alto.—A shrub of 2 to 7 ft., or more rarely in the primitive forests a small tree of 12 to 20 ft. : crown globular ; branches erect or sub-erect ; flowers racemose-paniculate, terminal, variegated, shining outside with a brown-golden indumentum ; standard brown-golden-red, whitish inside ; wings and keel violet-purple sometimes almost violet-blue ; pods always dehiscing when fully ripe though much thickened along the upper and usually also along the lower sutural edge. Not uncommon, in bushy places at the skirts of the primitive forests throughout the district, from Trombeta as far as Sange ; fl. March and April, fr. Jan. and June 1855 and March 1856, flower-bud Sept. 1854. Native name "Muzumbo," "Muzumbe," "Muzumba," or "Mussumbo." No. **1859**. Certainly the first and probably the other four of the following Nos. :—Coll. Carp. 383, 384, 392, 393, and 465.

Muzumba is a handsome tree occurring in rather dry situations in the eastern mountainous parts of the province ; the wood is justly reputed as one of the most beautiful, strong and durable ; and the inner bark is generally made available for ties in the construction of the huts (cubatas) of the natives ; so strong is this wood that the negroes often employ it instead of iron nails to pin chests together and other domestic utensils. (See Welw. Synopse, p. 15 n. 37.)

The following also apparently belongs to this species :—

Golungo Alto.—A small tree, with red-cinnamon tomentose paniculate papilionaceous flowers ; on the road from Cambondo to the

banks of the Luinha, fl. Dec. and Jan.; nearly ripe fr. COLL. CARP. 459.

5. **M. urophylla** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 129. *Phaseolodes urophyllum* O. Kuntze, *l.c.*, p. 202.

GOLUNGO ALTO.—A robust arborescent twining shrub, climbing to a great height, rambling over the crowns of trees, 5 to 6 ft. high in the thickets, 20 to 30 ft. high in the dense forests, in open ground standing as a little shrub, evergreen; trunk 2 to 2½ in. diam., more rarely 3½ to 4 in.; leaves, according to Welwitsch, resembling those of the tree "Muçumba"; flowers about ½ in. long, of a deep violet-rose colour; calyx bibracteolate at the base, velvety, shining with a golden-tawny gloss, sub-bilabiate-campanulate; upper lip somewhat bidentate; lower lip tridentate; corolla regularly papilionaceous, more or less of a rose colour; standard ovate-rounded, clawed, pubescent and sordid whitish-yellow outside, rose-coloured and spotted with green above the claw inside; wings of a deep rose colour, with a long claw, partly adhering to the keel; keel-petals free up to the middle, cohering towards the apex where the keel is puberulous with golden-tawny pilose hairs, in other respects altogether rose-coloured; stamens 10, much thickened and of a deep blood-purple colour at the base, in other parts white; the vexillary stamen free, the 9 other stamens connate in a half cylinder curved upwards at the apex, all fertile; ovary sessile, girt by a disk of moderate size, compressed, appressed-hairy, falcate; ovules several; pods very similar to those of *Millettia versicolor* Welw., and as in them promptly dehiscing when fully ripe. Frequent in the primitive forests around Sange and Mussengue, etc.; fl. March, Oct. and Nov. 1855, fr. Nov. and Dec. 1855. No. **1851**.

The following No. should be compared with this species, and with *M. macrophylla* Benth. in Hook. Ic. t. 788-9 (1848), a species which much resembles the former and may perhaps be identical with it:—

GOLUNGO ALTO.—A shrub as tall as a man, perhaps becoming subsequently a tree; leaves evergreen, chartaceous, glossy and deep-green above, whitish almost silvery-shining beneath, very delicately pellucid-punctate. In the thickets of Sobato de Mussengue; without either fl. or fr. August 1855. No. **6687**.

6. **M. nudiflora** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 130; Ficalho Pl. Uteis, p. 132 (1884).

Phaseolodes nudiflorum O. Kuntze, *l.c.*, p. 202.

GOLUNGO ALTO.—A vast beautiful tree, 30 to 40 ft. high, or a small tree of 15 ft.; trunk usually obliquely erect; branches spreading, sometimes pendulous, tuberculate; branchlets nodding, leafless or nearly so at the time of flowering; leaflets softly and thinly coriaceous, almost fleshy, deep-green and shining above, velvety-pubescent beneath; inflorescence ranging up to a foot in length; flowers of a brilliant violet-purple colour, crowded, covering as it were the whole tree; calyx brown-black at the base, red-brown from the middle of the tube up to the limb, bilabiately 5-toothed; standard obovate, hardly exceeding the wings and keel; erect or sub-reflexed at the time of flowering; callus green, furnished with 2 larger and other smaller glands, which however are sometimes obsolete; wings and keel of the same length, densely ciliate on the claws and at the base of the laminas; stamens 10, diadelphous; the vexillary one free, curved in a sigmoid manner at the

base ; ovary sessile, compressed, lanceolate-linear, gradually tapering into the style, furnished with white pilose hairs ; ovules 7 to 11 ; pods pendulous. In fl. 8 July, end of July, and in August 1856, in nearly ripe fr. and in leaf in August 1855 ; in the primitive forests of Quibanga about Sange, and at the left bank of the river Cuango. A kind of Mutalla-menha. No. **1850**.

7. **M. rhodantha** Baill. in Adans. vi. p. 223 (1866) ; Baker, *l.c.*, p. 131 ; Ficalho, Pl. Uteis, p. 133 (1884).

Milletia (sp.), Welw. Apont. p. 574, n. 174 (1859) ; Welw. Synopse, p. 8, n. 9, p. 46, n. 126, *ex parte*. *Phaseolodes rhodanthum* O. Kuntze, *l.c.*, p. 202.

Golungo Alto.—A small graceful tree, 8 to 12 ft. high, much branched above ; leaves glaucescent ; flowers of a pale-violet colour. On the bushy slopes of Mata de Quisucolo, near Bango Aquitamba ; fl. Jan. 1856, not common. No. **1852**.

Pungo Andongo.—A tree, 15 to 25 ft. high, erect, with a lax crown ; trunk 6 to 9 in. in diam. at the base ; wood sulphur-yellow, aromatic, of great utility among the negroes, being of high value and special medicinal virtue ; leaves glaucescent, mostly oval-oblong, rufous-shaggy along the midrib beneath ; stipules setaceous, rather exceeding the shaggy petiolules. In bushy wooded places near Caghuy, rather rare ; young fr. Jan. 1857 ; also near Luxillo at the end of Feb. 1857. No. **1853**. Coll. Carp. (specimen of the wood) 948.

This tree, which is variously called in Pungo Andongo "Quiseco," "Quisécua," and "Caseco," has a trunk attaining 1 to 2 ft. in diam., and its wood is yellow, dense, firm and durable, and has a pleasant aromatic odour ; it is employed for the making of domestic utensils and agricultural implements (see Welw. Synopse, p. 8, n. 9, and Apont. p. 574, n. 174). The aromatic powder of Caseco (or Caseque) is obtained from the quite dry trunks of this species and also of *M. gracilis* ; the native medical men chiefly apply it in the form of a tonic ointment in the treatment of nervous and rheumatic headaches, nearly always mixed with the powder of Pemba stone. Sticks of the Caseco drug are invariably supplied in the markets of the coast and also in the interior ; and there is sufficient reason to believe that other trees besides those mentioned furnish it : thus, for example, the powder of Quicongo (*Tarchonanthus*) is often sold under this name. The native doctors do not use it as sawdust, but they know how to grind it to a very fine powder by carefully grating the wood over a rough stone. (See Welw. Synopse, p. 46, n. 126.)

8. **M. Baptistarum** Büttner in Verh. Bot. Brandenb. xxxii. p. 50 (1890).

Ambriz.—A small tree, branched almost from the base upwards. In rather open wooded situations below the bridge of Ambriz in the direction of Mubango ; fr. end of Nov. 1853. No. **1846**.

Pungo Andongo.—A tree, 15 to 20 ft. high ; trunk 6 to 8 in. in diam. at the base ; wood yellowish ; leaves sparingly pellucid-punctate. In mixed rocky and somewhat stony woods near Luxillo, sporadic ; in flower-bud middle of May and of June 1857. A kind of Mutalla-menha. No. **1845**. A tree, 20 to 30 ft. high, with the habit of an ash in the forests, but not uncommonly reduced to a shrub of 6 to 8 ft. with numerous stems in secondary thickets ; flowers not seen. In wooded places along the banks of the stream Lutete and in sandy neighbouring forests ; nearly ripe fr. June 1857. No. **1849**.

I have not seen the type of the above species which belongs to the Lower Congo, but the description of it agrees ; No. 1846 is apparently the plant referred to by Baker in Oliv. Fl. Trop. Afr. ii. p. 128 under *M. Thomingii*.

14. **PLATYSEPALUM** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 131.

1. **P. violaceum** Welw., *l.c.*

Golungo Alto.—A tree of 10 to 20 ft. with a lax crown, sometimes only a shrub even when in flower ; branches erect or spreading a little ; leaves 1 to 3- or rarely 4-jugate, imparipinnate ; leaflets opposite, chartaceous-coriaceous, of a pale green colour, ovate or obovate-oblong, obtusely acuminate, apiculate, glabrous and shining above, pubescent beneath as well as on the petiolules ; stipels subulate ; flowers of a pale violet colour, in axillary or quasi-terminal panicles ; calyx bibracteolate, bilabiate ; upper lip very broad, elongated, with a thick-nerved back, petaloid, silky, violet-coloured, equalling the standard, obovate, obtuse emarginate or bilobed at the apex ; lower lip deeply tridentate, the lateral lobes ovate-lanceolate acuminate, the middle lobe longer and narrower than the lateral ones ; corolla glabrous, embraced and nearly concealed by the upper plicate tip of the calyx ; standard obcordate, straight at the time of flowering ; wings a little shorter than the standard and keel, elongated-oblong, obtuse, shortly unguiculate, minutely auriculate, somewhat adhering to the keel ; keel obliquely oblong ; stamens 10, diadelphous ; filaments filiform ; anthers broadly oblong, uniform, versatile ; ovary sessile or subsessile, densely silky-pilose, 5-7-ovuled ; style incurved, glabrous ; stigma rather small, obliquely truncate. Rather rare, at the margins of the forests of Sobato de Bumba and of Mussengue ; in flower-bud and fl. Dec. 1854. Also in the secondary thickets between Cambondo and Trombeta, sparingly ; fl. and young fr. Feb. 1855, fr. June 1855. No. **1838**. Coll. Carp. 499.

The Fungus n. 226 grew on the leaflets of this plant.

15. **MICROCHARIS** Benth. & Hook. f. Gen. Pl. i. p. 501.

1. **M. angolensis** Baker in Oliv. Fl. Trop. Afr. ii. p. 132.

Pungo Andongo.—A slender annual herb ; flowers of a deep red colour, the older ones blood-red. Frequent, in open sandy forests, along the banks of the river Cuanza, near Calunda-Quisonde ; fl. Jan. 1857. No. **2004**.

16. **SESBAN** Adans. Fam. Pl. ii. p. 327 (1763). *Sesbania* Scop. Introd. p. 308 (1777), Benth. & Hook. f. Gen. Pl. i. p. 502.

1. **S. punctatus** DC. Prodr. ii. p. 265 (1825), Baker in Oliv. Fl. Trop. Afr. ii. p. 133 (*Sesbania punctata*).

Sesbania (sp.) Welw. Apont. p. 591, n. 109 (1859). *Emerus Sesban* var. *picta* O. Kuntze, Rev. Gen. Pl. i. p. 181 (1891).

Golungo Alto.—A very elegant little tree, wholly herbaceous, 10 to 15 ft. high, patently branched from the base to the apex, usually annual ; in damp tall-grassy places and thickets throughout the district ; Mussengue ; fr. April 1855. Varzea grande do Cuango, near Sange : fl. and fr. May and June 1855 and 1856 and March 1856. No. **1994**.

Pungo Andongo.—A very elegant undershrub, 4 to 5 ft. high, with

remarkably large bright-golden flowers. In palm groves, at the banks of the river Cuanza near Sansamanda, rather rare; fl. April 1857. No. **1997**.

Huilla.—An elegant slender undershrub, hardly a shrub, in the form of a tree, 6 to 8 ft. high, very loosely branched; stem below and branches muricate, black-punctate; branches elongated, patent; flowers yellow. In bushy places, along the banks of the river Monino; fl. and fr. April 1860. A muricate variety. No. **1995**. Flowers racemose, yellow; pods linear, a foot long. In rocky stations by the river Monino; fr. April 1860. Coll. Carp. 56.\

2. **S. pachycarpus** DC. Prodr. ii. p. 265 (1825), Baker, *l.c.*, p. 134 (*Sesbania pachycarpa*).

Emerus Sesban var. *occidentalis* O. Kuntze, *l.c.*, p. 181.

Pungo Andongo.—An erect herb, a foot high, with glaucous foliage. In fields formerly cultivated with *Arachis hypogæa* L., near Condo; fl. March 1857. No. **1998**.

Mossamedes.—A herb, 1 to 3 ft. high, with sub-erect branches and fruits. Sporadic in the damp sandy thickets of Mata dos Carpenteiros, plentifully, but not seen in other parts of this district; fl. and fr. July 1859. No. **1996***b*.

In this case, as also in others in this genus, I have followed the determinations of Mr. Baker, who had the specimens under his inspection.

3. **S. cinerascens** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 134 (under *Sesbania*).

Emerus Sesban, var., O. Kuntze, *l.c.*, p. 181.

Pungo Andongo.—An undershrub, about 4 ft. long, wholly ashy-pubescent, virgately branched; pods nearly a foot long. In thickets near the river Lombe; flower-bud, fl. and fr. March 1857. No. **1999**. A tall arborescent herb, 7 to 12 ft. high, with an ashy aspect, patently branched; leaflets glaucescent, puberulous; floral racemes yellow, nodding or even pendulous; pods 12 to 16 in. long, linear, terminated by the style which is indurated, nearly half an inch long and rather blunt. In bushy places by streams, near Pedra Cabondo; fl. and fr. April 1857. No. **2000**. A very elegant bush, 12 ft. high, wholly herbaceous; leaves very long, densely pinnate; flowers racemose, yellow; racemes sub-nutant. In moist thickets by the river Cuanza near Candumba; fr. March 1857. Coll. Carp. 386.

4. **S. ægyptiacus** Poir. in Lam. Encycl. Méth. vii. p. 128 (1806). *Sesbania ægyptiaca* Pers. Syn. Pl. ii. p. 316 (1807); Baker, *l.c.*, p. 134.

Emerus Sesban O. Kuntze, *l.c.*, p. 180.

Mossamedes.—Slightly muricate on the upper part of the branches. In damp sandy thickets, near Mata dos Carpenteiros, frequent; fl. and fr. July 1859. Doubtfully referred to this species. No. **1996**.

5. **S. pubescens** DC. Prodr. ii. p. 265 (1825), Welw. Apont. p. 585, n. 24 (1859), Baker, *l.c.*, p. 135 (under *Sesbania*).

Emerus pubescens Schum. Guin. Pl. p. 354 (1827). *Sesbania sericea* Welw., *l.c.*; non DC., nec Link. *E. Sesban*, var., O. Kuntze, *l.c.*, p. 181.

Loanda.—Annual; stem erect, 2 to 4 ft. high, as well as the leaves silky-pubescent; standard sordid-yellow outside, very densely black-dotted, pale yellow inside; wings deep yellow; keel yellowish-green;

rather rare in moist sandy places near Praia de Zamba Grande ; fl. and fr. 9 March 1858. A shrub-shaped herb, 5 to 8 ft. high, much branched ; principal stems usually 1 inch in diam. but wholly herbaceous ; flowers yellow ; pods cylindrical, very long, 8-seeded ; in marshes, in company with *Typha*, etc., near F. de Conceição ; fl. and young fr. April 1854. Garden at Loanda, April 1859. No. **1992.** Coll. Carp. 387.

6. **S. sphærocarpus** Welw. Apont. p. 590, n. 82 (*Sesbania sphærocarpa*).

Sesbania sphærosperma Welw. ex Baker, *l.c.*, p. 135. Cf. *Sesbania* (sp.) Welw. Apont. p. 588 n. 51. *Emerus sphærospermus* O. Kuntze, *l.c.*, p. 181 (1891).

Loanda.—A slender undershrub, almost a full-sized shrub ; stems not uncommonly woody at the base and persisting for years, 3 to 6 ft. high, patently branched ; stem branches and petioles sparingly muricate ; flowers pale yellow ; standard not dotted ; pods subulate-mucronate, very rigid, undulate-alate on both sides ; seeds globose. Frequent in dry hilly situations, above the city of Loanda ; fl. and fr. end of Feb. 1858. Imbondeiro dos Lobos, beginning of July 1858. No. **1991.** An undershrub, 3 to 5 ft. high. In the more elevated moist bushy parts of the district ; fr. Feb. 1858. Coll. Carp. 389.

Libongo.—An elegant yellow-flowered undershrub of 4 to 6 ft. In damp thickets at the river Lifune, Oct. 1858 ; at Loanda cultivated fr. Nov. 1860. Coll. Carp. 388.

The following No. appeared to Welwitsch to be a weak form of this species :—

Loanda.—An annual prostrate-diffuse herb ; flowers yellowish ; pods flattened along the edge, deeply crenate ; seeds compressed, quadrangular, not spherical. In flooded places about to dry up, Imbondeiro dos Lobos, very rare ; fl. and fr. 8 June 1858. No. **1993.**

17. **COLUTEASTRUM** Heister (1732) & ex Fabric. Enum. Pl. Hort. Helmstad. edit. 2, p. 317 (1763). *Lessertia* DC. (1802) ; Benth. & Hook. f. Gen. Pl. i. p. 503.

1. **C. benguellense.**

Lessertia benguellensis Baker in Oliv. Fl. Trop. Afr. ii. p. 137.

Mossamedes.—An undershrub ; stems numerous, virgate, ascending ; flowers greenish-purple ; calyx campanulate, green, equally 5-toothed ; standard obovate, emarginate at the apex, with the sides folded backwards, equalling in length the boat-shaped keel, greenish-yellow, marked with purple lines ; wings lanceolate, green-yellowish, thinly marked with purple lines, violet-purple at the apex ; keel yellow-greenish, with a violet-purple beak (half) longer than the wings. Stamens diadelphous (1 and 9) ; ovary stipitate, 5-7-ovuled, naked ; style ascending, compressed, rather smooth, not bearded except a fringe of hairs around the apex ; stigma papillose ; pods broadly and obtusely elliptical, compressed-flat, scarious, pellucid, 3 to 6-seeded, not or scarcely inflated. In rocky stony places in the desert, the rocks being composed of hard red sandstone, at the base of Serra de Montes Negros ; fl. and fr. 10 August 1859. No. **1986.** A perennial herb, 1 to 2 ft. high ; stems numerous ; leaves imparipinnate ; flowers reddish ; pods compressed, scarcely inflated. In stony places in the Mossamedes desert ; fr. August 1859. Coll. Carp. 113.

18. **DIPHACA** Lour. Fl. Cochinch. p. 453 (1790). *Ormocarpum* P. Beauv. (1805); Benth. & Hook. f. Gen. Pl. i. p. 515.

1. **D. cochinchinensis** Lour. Fl. Cochinch. p. 454 (1790). *Ormocarpum sennoïdes* DC. Prodr. ii. p. 315 (1825); Baker in Oliv. Fl. Trop. Afr. ii. p. 143. *Hedysarum fruticosum* Röttler ex Schum. Guin. Pl. p. 356 (1827). *Solurus cochinchinensis* O. Kuntze, Rev. Gen. Pl. i. p. 205 (1891). *O. Buchholzii* Engl. Bot. Jahrb. vii. p. 336 (1886) fide Taub. in Engl., *l.c.*, xxiii. p. 189 (1896).

Loanda.—In valleys near Boa Vista, in Feb. 1854; specimens destroyed. No. **2118**.

Golungo Alto.—An erect shrub, branched from the base, 3 to 4 ft. high; bark purple-black; leaflets deep-green above, glaucous below; standard and wing-petals sulphur-coloured, marked with brown-purple veins; keel pale-sulphur; pod even when young quite glabrous. In moist secondary thickets along the base of Serra do Alto Queta near the river Cuango, at Arimo do Isidro; fl. and young fr. end of March 1856. No. **2117**.

Cazengo.—A much-branched shrub, 3 to 4 ft. high; branches and branchlets patent, the upper ones rather erect; bark red-brown, smooth; flowers racemose, in the uppermost axils of the leaves; calyx bilabiate, 5-fid, green; keel sordid-straw colour; petals of the keel and standard straw-coloured, marked in a jointed manner with purplish veins. Sparingly in the rather dry thickets on the left bank of the river Luinha and Palmeira; fl. and young fr. Dec. 1854. No. **2117***b*.

19. **HERMINIERA** Guill. & Perr.; Benth. & Hook. f. Gen. Pl. i. p. 515.

1. **H. Elaphroxylon** Guill. et Perr. Fl. Senegamb. Tent. (i.) p. 201, t. 51 (1833); Welw. Apont. p. 573 (1859); Baker in Oliv. Fl. Trop. Afr. ii. p. 144; Ficalho, Pl. Uteis, p. 133 (1884).

Barra do Bengo.—An erect weak little tree, 12 to 20 ft. high, almost pyramidal, with elongated primary trunk and branches virgate elongated, gradually shorter; lower branches nodding; flowers large saffron-orange-coloured, very elegant and handsome; pod spirally curved inwards. Along the left bank of the river Bengo, near Quifandongo, not abundant; fl. and ripe fr. 12 Sept. 1854. No. **2119**. Wood very light and quite white; trunk a foot and more in diam. at the base. By the river Bengo; fr. June 1857. Coll. Carp. 394.

Mossamedes.—A low tree, sometimes slender, at other times with a trunk nearly a foot in diam. at a foot above the ground, then suddenly much narrowed and 6 or 7 ft. higher scarcely 1 to 1½ in. thick, growing densely cæspitose, ranging from 10 to 15 ft. in height, much branched, usually mutilated by the negroes; timber very light and useful. In marshy places along the banks of the river Caroca (at the time of collection only a rivulet), near Porto de Pinda and Cabo Negro in the interior; fl. 2 Sept. 1859. No. **2120**. Cabo Negro, Sept. 1859. Wood. Coll. Carp. 949.

This tree is called "Bimba" by the colonists, and perhaps also by the N-Bundas. The timber of Bimba much resembles that of the Pita-thread tree (*Agave*); it does not exceed 20 or at the most 25 ft. in height, and its trunk measures at the base 6 to 16 in. in diam.; notwithstanding its fibrous appearance the wood is strong and durable, and the natives of Benguella and Mossamedes frequently use it for domestic purposes, such as beds, stools, etc., and more especially for

fishing punts and landing-boats. Welwitsch found it the most suitable wood for boxes for his entomological collections. The tree grows abundantly in marshes and by streams along nearly the whole extent of the coast of the province. See Welw. Synopse, p. 20, n. 50.

20. **ÆSCHYNOMENE** L.; Benth. & Hook. f. Gen. Pl. i. p. 515.

1. **Æ. papulosa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 146.

Pungo Andongo.—Joints of the pod densely papulous on a raised strictly limited disk. Sporadic, in marshy thickets at the base of the mountains of Serra de Pedras de Guinga; fl. and fr. March 1857. Only one branch was collected, it being at the time considered to belong to *Æ. indica* L. No. **2171**.

2. **Æ. oligantha** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 146.

Mossamedes.—An undershrub, at the base but little woody, 3 to 4 ft. high, or a tall herb, apparently annual or biennial; branches subscandent, remote; flowers pale-yellow. Sporadic, in marshy places, growing amidst tall plants of *Arundo* and *Scirpus*, about the estuary of the river Giraul; fl. and with only one fr. July 1859. No. **2172**.

3. **Æ. indica** L. Sp. Pl. edit. 1, p. 713 (1753); Baker, *l.c.*, p. 147.

Ambaca.—A suffrutescent herb, much branched from the base; branches rather spreading; leaves glaucescent; flowers sulphur-coloured. In damp pastures, at the right bank of the river Lucala, not far from the ferry; fl. and fr. middle of Oct. 1856. No. **2170**.

The following appears to be the plant referred to by Welwitsch, Apont. p. 590, n. 81 (1859), as "genus novum?"; it also seems to be a form or variety of *Æ. indica* L., with solitary flowers and peculiar habit, the stem being $\frac{1}{2}$ in. thick at the base, quite spongy and quickly attenuate:—

Loanda.—An annual suffrutescent herb, 1 to 4 ft. high, forming a bush or little tree with a *Mimosa*-habit; branches spreading; leaves somewhat sensitive; flowers solitary, small; wing-petals and keel yellow; standard yellow with red venation; pods flat, separating in joints. In great abundance, at the margins of pools, in clayey places flooded in the rainy season, near Alto das Cruzes, forming miniature forests; fl. and fr. Feb. 1858, fruiting specimens and seedlings crowded together in July 1858; not seen in the years 1853 and 1854. No. **2169**. Joints of the pod 8 to 11, square, crested on each face. Seen only in one locality, but abundant, by the marshes of Alto das Cruzes; fl. and ripe fr. end of April 1858. Coll. Carp. 445.

4. **Æ. aspera** L. Sp. Pl. edit. 1, p. 713 (1753); Baker, *l.c.*, p. 147.

Pungo Andongo.—An erect or ascending herb, 5 to 6 ft. high; stem muricate; prickles herbaceous; corolla yellow. In marshy palm-groves and thickets, along the banks of the river Cuanza, near Sansamanda; fl. and fr. Feb. and March 1857. No. **2168**.

5. **Æ. acutangula** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 148.

Pungo Andongo.—An erect herb, 3 ft. high; stem purple, with acute angles; stipules sagittate; racemes paniculate; flowers yellow; bracts very caducous; whole plant, except the flowers, livid-glaucescent. Sparingly, in marshy reedy places, at the banks of the river Cuanza, near Mupopo, at an elevation of 3800 to 4000 ft.; fl. and fr. May 1857. No. **2173**.

6. **Æ. pygmæa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 148.

HUILLA.—A dwarf, viscid-glandular, hispidulous, copiously flowering undershrub, 3 to 7 in. high, growing in a cæspitose manner; stems branched from the base, muricate, yellowish; branches erect, bearing at the apex many-flowered racemes; stipules lanceolate, rigid, scarcely drawn out at the base, persistent; leaflets 10-15-jugate, terminating with a seta; flowers deep-orange-yellow, brilliant, about ½ in. long; bracts fugacious; ovary bi-ovulate; joints of the fruit half-orbicular, glabrous. In thinly-bushy sandy pastures, along the borders of forests, in company with species of *Thesium* and *Thunbergia*, near Mumpulla, towards Nene, at an elevation of about 4000 ft., and seen nowhere else; fl. and sparingly fr. end of Oct. 1859. No. **2180**.

7. **Æ. glabrescens** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 148.

HUILLA.—A herb, ½ to 1 ft. high, growing almost in a cæspitose manner; root thick, woody, several-headed; stems branched from the base, purplish, pluri-sulcate, remotely hispid; flowers orange-coloured. In the elevated sandy, sparingly bushy, somewhat damp pastures of Empalanca, but rather rare; only a few specimens seen in flower and fruit, the rest barren; fl. and fr. end of March 1860. No. **2177**.

8. **Æ. fulgida** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 149.

HUILLA.—A little erect shrub, 2 to 2½ ft. high; stem and branches bright-purple, viscid in the living state; flowers of a fulgid-orange colour when fresh. The most beautiful of all the species of this genus in Angola. Abundant on the bushy slopes of Morro de Lopollo in the direction of Humpata, on mica-schist, at an elevation of about 5200 ft.; fl. and ripe fr. April 1860. No. **2178**.

9. **Æ. bracteosa** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 150.

HUILLA.—A hard rigid slender erect undershrub, 1½ to 2 ft. high; stems purplish; branches rather patent; leaves glaucous; stipules very fugacious; flowers golden or saffron-yellow; bracts glandular-toothed, persistent even after the fall of the fruit; ramifications of the inflorescence muricate. Not uncommon, at an elevation of about 4000 to 5000 ft., in shortly bushy pastures near Humpata; fl. and ripe fr. end of March and beginning of April 1860. No. **2176**.

10. **Æ. tenuirama** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 150.

PUNGO ANDONGO.—A slender erect shrub, 2 to 3½ ft. high; stems several, virgately branched; stipules lanceolate, not drawn out downwards at the base, fugacious; leaflets 15-20-jugate, not with raised lateral nerves beneath; petioles as well as the branches glandular-pilose; racemes terminating the paniculate branchlets; flowers deep-yellow, ¼ to ⅓ in. long. Frequent at the bushy borders of primitive forests between Mutollo and Candumba; fl. and fr. March 1857; at an elevation of 3800 to 4000 ft. No. **2181**.

Var. β. **sculpta** Welw. ms. in Herb.

Leaflets 30-50-jugate, with 6 to 10 raised secondary nerves on each side of the midrib beneath; flowers few, deciduous.

PUNGO ANDONGO.—In exposed primitive woods at the banks of the river Cuanza; scarcely in full fl. Feb. 1857. Nos. **2181***b*, **2182**.

Var. γ. **huillensis** Welw. ms. in Herb.

An undershrub, 2 to 4 ft. high, either erect or ascending at the base, virgate, very elegant; stems simple at the base, towards the

apex with crowded slender branches; branchlets filiform, bearing racemes at the apex; stipules lanceolate, enlarged at the base with an acute auriculate tooth, but scarcely spurred; leaflets about 40-jugate, subcordate at the base; common axis remotely spinulose beneath; petiolule compressed-flat; flowering branches pyramidally paniculate towards the apex of the stem; flowers golden yellow.

Huilla.—Rather sparingly in shortly-bushy pastures between Nene and Humpata; fl. and fr. April 1860; at an elevation of 4800 to 5000 ft. No. **2183**. By streams near Lopollo; fr. Dec. 1859. Coll. Carp. 446.

11. **Æ. debilis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 150.

Huilla.—An undershrub; stem 2 to 3 ft. long, thin, weak, half scandent; branches crowded, elongated, lying on neighbouring shrubs; stipules not spurred at the base; inflorescence glandular-viscid; flowers yellow. In bushy damp places at the skirts of forests along the road leading from Lopollo in the direction of Jâu, at an elevation of about 5000 ft.; fl. and fr. April 1860. No. **2175**.

12. **Æ. dimidiata** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 151.

Huilla.—An undershrub, 2 ft. high; stems several, sub-erect or oblique; branches elongated, bearing at the apex paniculate racemes; stems branches petioles and branchlets of the inflorescence glandular-viscid hispid and muricate: leaflets 25-50-jugate, glaucous, glabrous, dimidiate, one side being abortive or very narrow and the principal nerve sub-lateral; flowers yellow, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. On bushy hills, in damp places, with tall herbage, between Nene and Lopollo, at an elevation of 5000 ft.; fl. and ripe fr. end of May 1860. No. **2179**. Leaves sensitive, viscid; flowers rarely fruiting. Mumpulla; fr. 1 June 1860. Coll. Carp. 447.

13. **Æ. siifolia** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 151.

Pungo Andongo.—A strictly erect herb, 3 to 5 feet high; stem sub-simple, very rough with acute crowded papillæ (but the upper part nearly smooth on the dried specimen); stipules not spurred at the base, leaflets 30-35-jugate, those towards the apex of the common axis gradually smaller, the extreme ones very small; the leaves, especially the stem ones, rather resembling in this respect those of some species of *Sium*; flowers yellow. In damp places amidst reeds and in palm-groves consisting of *Phœnix reclinata* Jacq., along the marshy banks of the river Cuanza, near Sansamanda, at an elevation of about 3800 ft.; fl. and fr. Feb. 1857. No. **2174**.

21. **DAMAPANA** Adans. Fam. Pl. ii. p. 323 (1763). *Smithia* Ait. (1789); Benth. & Hook. f. Gen. Pl. i. p. 516.

1. **D. capitulifera** O. Kuntze, Rev. Gen. Pl. i. p. 179 (1891).

Smithia capitulifera Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 152.

Pungo Andongo.—An annual erect gregarious herb, a palm high, branched from the base; stem and branches flowering at the apex, with spreading pilose hairs; leaflets 6-7-jugate, highly sensitive to the touch; the upper calyx-teeth longer than the lower ones, all acute; standard shortly unguiculate; ovary scarcely or very shortly stipitate, bi-ovulate: pod hyaline-membranous, bi-articulate, drawn back within the calyx. Frequent in the marshy pastures of Serra de Pedras de Guinga, at

an elevation of about 4000 ft., above that occupied by *Myrothamnus flabellifolius* Welw. ; fl. and fr. end of March 1857. No. **2138**.

HUILLA.—An annual herb, scarcely a span high, with somewhat the habit of the small species of *Phyllanthus*, branched from the base in an ascending manner ; leaves alternate, pinnate, very highly sensitive, the leaflets after being touched quickly lying together along the common rachis ; flowers in little cymes at the apex of the stem and branches, white, deflexed-nodding ; bracts rather large, glandular at the margin, glands long-pilose, hairs solitary hyaline ; ovary scarcely or very shortly stipitate, bi-ovulate. Frequent in very elevated, rather spongy meadows on the Humpata plain, also on the highest parts of Empalanca in company with species of *Eriocaulon* and Gentianaceæ, etc. ; fl. but not yet in fr. 2 April 1860. No. **2139**.

2. **D. æschynomenodes** O. Kuntze, Rev. Gen. Pl. i. p. 179 (1891).
Smithia æschynomenoides Welw. ex Baker, *l.c.*, p. 153.

HUILLA.—An erect shrub, 2 to 2½ ft. high, setose-hispidulous ; leaflets ranging up to 17-jugate, sensitive ; flowers purplish, quickly turning yellow ; bracteoles 2, opposite, horizontally spreading at the base of the calyx ; calyx bilabiate, the upper lip emarginate, the lower lip trifid ; all the lobes rounded ; standard with a rather long claw ; ovary stipitate, 2- very rarely 3-ovulate ; pod 2-jointed, 2-seeded, retracted within the calyx ; joints smooth, rather compressed. In damp, grassy places along the borders of forests, at a place called O Monino or Moninho ; fl. and young fr. April 1860. No. **2136**. A slender hispidulous undershrub, 2 to 3 ft. high ; stipules thin, scarious, whitish, very caducous ; in grassy places along rivulets near Catumba, sparingly ; not yet in fl. March 1860. No. **2136***b*.

The following No., without either flower or fruit, should be compared with this species and may belong to it :—

HUILLA.—An undershrub, 3 ft. high, wholly glandular-pilose, with quite the habit of the species of *Damapana* of this district, and with glaucescent sensitive leaflets ; in grassy places at the banks of the river Cacolovar between Ivantâla and Quilengues ; not yet in fl. end of Feb. 1860. No. **2140**.

3. **D. strobilantha** O. Kuntze, Rev. Gen. Pl. i. p. 179 (1891).
Smithia strobilantha Welw. ex Baker, *l.c.*, p. 154.

HUILLA.—A low shrub ; stems woody, branched from the base ; branches straggling, often decumbent, flexuous, hard, tenacious, with glandular spreading shaggy hairs ; leaflets in three pairs, glabrous, glaucous beneath, about 5-nerved from the base, oblique, veins between the nerves transverse ; petiole shaggy ; stipules not produced at the base of the compact strobile. Frequent enough in thickets on a dry sandy-clayey very hard soil, with short grass, near Ferrão da Sola, in the Lopollo territory ; fl. May 1860. No. **2137**.

4. **D. strigosa** O. Kuntze, Rev. Gen. Pl. i. p. 179 (1891).
Smithia strigosa Benth. in Pl. Jungh. p. 211 (1852); Baker, *l.c.*, p. 154.

HUILLA.—A shrub, 2 to 3 ft. high, erect ; stem and branches clothed with strict hispid hairs bulbous at the base ; leaves sensitive ; flowers of two colours in the living state, orange-coloured in the dry state ; standard and wing-petals violet, keel yellow ; ovary often bi-ovulate, appressedly pilose ; style moderately curved, compressedly dilated up to the apex, shorter than in the other species. Not uncommon in

bushy rocky rather dry places from Ferrão da Sola in the direction of Jâu ; fl. beginning of April 1860. No. **2135**.

5. **D. Welwitschii.**

Smithia Welwitschii Taub. in Engl. Bot. Jahrb. xxiii. p. 190 (1896).

A glabrous shrub, 2 to 4 ft. high, rarely higher, with the habit of a *Coronilla* ; branches hard, brown-purple ; branchlets (after the leaves have fallen) nodose and pseudo-articulate ; leaves paripinnate, 3- or 4- or rarely 5-jugate, glaucous, rather fleshy, (including the common petiole of $\frac{1}{5}$ to $\frac{2}{5}$ in.) measuring $1\frac{1}{4}$ to $1\frac{3}{4}$ in. long or more ; leaflets opposite, obliquely oval, obtuse at both ends, retuse and mucronulate at the apex, shortly petiolulate and unequal at the base, reticulate, $\frac{2}{5}$ to $\frac{4}{5}$ in. long by $\frac{1}{4}$ to $\frac{2}{5}$ in. broad ; stipules large, quickly caducous, round-oval, sessile, with parallel and anastomosing veins, about $\frac{1}{2}$ in. long by $\frac{1}{3}$ in. broad, not adnate to the petiole ; stipels 0 ; racemes quasi-terminal, about 2 in. long or sometimes longer, bearing about 10 flowers ; common peduncle about $\frac{1}{4}$ in. long ; bracts obcordate-orbicular, greenish-yellow, scarious, persistent, not ciliate, with parallel and anastomosing veins, $\frac{1}{2}$ to $\frac{2}{3}$ in. long, sessile ; pedicels about $\frac{1}{10}$ in. long, curved, hairy ; flowers yellow, about $\frac{2}{5}$ in. long, enclosed separately in the doubled bracts ; bracteoles 2, oval, entire, ciliolate, $\frac{1}{6}$ in. long, at the base of the flower ; calyx deeply bilabiate, equalling the corolla ; upper lip bidentate, lower lip tridentate ; wing-petals marked outside with 3 short stripes ; stamens 10, monadelphous ; filaments alternating longer and shorter ; ovary hairy ; pod usually 1- or 2- very rarely 3-jointed. Fruiting racemes much resembling the strobiles of *Humulus Lupulus*, L.

Huilla.—In elevated rocky thickets, abundant but found only in one spot in Morro de Monino (or Moninho) ; fl. Feb. and in nearly ripe fr. middle of April 1860. No. **2141**.

This species differs from other species of the genus by its large round investing bracts, and approaches the genus *Geissaspis*.

22. **STYLOSANTHES** Swartz ; Benth. & Hook. f. Gen. Pl. i. p. 517.

1. **S. erecta** P. Beauv. Fl. Ow. ii. p. 28, t. 77 (1807) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 156.

Var. **guineensis** Vog. in Linnæa xii. p. 68 (1838) ; Taubert in Verh. Bot. Brandenb. xxxii. p. 24 (1890).

Ambriz.—Frequent on dry gravelly hills near Ambriz ; fl. and fr. Nov. 1853. No. **2123**.

Loanda.—A pale-green herb, with the habit of *Ononis* ; rootstock thick, many-headed, perennial ; stems ascending ; flowers yellow, the fertile ones not uncommonly apetalous and without stamens ; seeds reniform. On sea-sands near Penedo ; fl. and fr. Jan. 1858. No. **2124**.

Pungo Andongo.—In sandy pastures between Caghuy and Sansamanda, among shrubs ; fl. and fr. Feb. 1857. Quoted by Taubert under this variety, but referred by Baker, *l.c.*, p. 157 to the next species. No. **2125**.

Var. **acuminata** Welw. ex Baker, *l.c.* ; Taubert, *l.c.*, p. 23.

Pungo Andongo.—An erect slender little shrub, 2 to 3 ft. high ; stems at length smooth ; leaflets much acuminate, $\frac{1}{2}$ to $1\frac{1}{5}$ in. long,

longer than in the other species, scattered beneath as well as the stipules and bracts with pilose hairs each of which emerge from a sessile gland. In sandy thickets on the right bank of the river Cuanza, between Condo and Quisonde ; fl. and fr. March 1857. This is the type of this variety, but by number it is referred by Taubert, *l.c.*, p. 24 to the previous variety. No. **2127**.

2. **S. mucronata** Willd. Sp. Pl. iii. p. 1166 (1800) ; Baker, *l.c.*, p. 157 ; Taubert in Verh. Bot. Brandenb. xxxii. p. 19 (1890).

Huilla.—Flowers yellowish ; standard violet, striped. In wooded moist meadows, usually by ant-hills around Catumba ; fl. Jan. and beginning of April 1860. No. **2126**.

23. **ARACHIS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 518.

1. **A. hypogæa** L. Sp. Pl. edit. 1, p. 741 (1753) ; Welw. Apont. p. 557 sub n. 132, p. 558 sub n. 133, et p. 573 (1859) ; Welw. Sert. Angol. p. 6 (1869) ; Baker, *l.c.*, p. 158 ; Ficalho, Pl. Uteis, p. 133 (1884) ; Schweinf. Heart of Africa, i. pp. 160, 250.

Golungo Alto.—Cultivated commonly in damp places throughout the district, especially near villages ; fl. near Sange Jan. 1856. Native name "Jinguba." Fl. from Jan. to April ; fr. from July to Nov. No. **2121**. Coll. Carp. 395. Introduced from Cazengo ; Trombeta, fr. July 1857. Coll. Carp. 396.

Mossamedes.—Cultivated by the negroes and Portuguese colonists ; and occasionally spontaneous, for example near Quipola ; fl. August 1859. No specimen separated for the British Museum. No. **2122**.

This species is much cultivated throughout tropical Africa and in Natal as also in other tropical countries. Welwitsch, *l.c.*, p. 573 states that it is especially frequent in the district of Ambaca ; and Dr. Schweinfurth, *l.c.*, p. 250 declares that the proper home of this plant is in Africa ; it is usually said to be a native of tropical America.

24. **ZORNIA** Gmel. ; Benth. & Hook. f. Gen. Pl. i. p. 518.

1. **Z. diphylla** Pers. Syn. Pl. ii. p. 318 (1807) (*diphyllum*) ; Baker, *l.c.*, p. 158.

Loanda.—A small annual rather erect herb ; flowers almost entirely concealed between pellucidly 5-nerved glandular-dotted bracts ; corolla orange-coloured with purple lines. In sandy hilly rather dry pastures, from Maianga de Povo in the direction of Alto das Cruzes, Bemposta, etc., plentiful but sporadic ; fl. and fr. April and May 1854, 1858 and 1859. No. **2112**.

Golungo Alto.—Not uncommon, in wooded meadows with short herbage between Undelle and Cambondo ; fl. and fr. March and April 1855. A form with leaflets ranging up to $\frac{1}{2}$ in. in width. No. **2113**. An annual herb, a foot high. Sange ; fr. August 1855. Coll. Carp. 397.

Ambaca.—A suffruticose perennial herb, densely cæspitose, with a woody many-headed rootstock, numerous stems, and the habit of thyme ; flowers whitish-yellow ; keel reddish-brown. In sandy bushy pastures, on the left bank of the river Lucala, at an elevation of 3000 ft. ; fl. towards the end of Oct. 1856. No. **2115**.

Pungo Andongo.—A small annual erect herb, branched from the base ; branches ascending, virgate ; corolla small, standard and scarlet wing-petals embracing the yellowish keel. Frequent in exposed rocky places with short herbage, at the base of Pedra Cabondo in the western part of the fortress ; fl. and fr. end of Dec. 1856. No. **2114**.

2. **Z. bracteata** Gmel. Syst. Veg. p. 1096 (1791); Baker, *l.c.*, p. 159.

Huilla.—Leaflets 4, lanceolate ; joints of the pod densely echinate. Common in the elevated sandy-earthy pastures of the plateau of Empalanca, often flooded in the rainy (summer) season, at an elevation of about 5500 ft.; fl. and fr. April 1860. No. **2116**.

25. **MEIBOMIA** Heister (1732) & ex Fabric. Enum. Pl. Hort. Helmstad. edit. 1, p. 168 (1759). *Desmodium* Desv. (1813); Benth. & Hook. f. Gen. Pl. i. p. 519.

1. **M. polygonodes** O. Kuntze, Rev. Gen. Pl. i. p. 198 (1891).

Desmodium polygonoides Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 161.

Pungo Andongo.—A perennial herb ; root long, very tenacious, thick, woody, many-headed ; stems a span long or shorter ; habit like some small *Polygonum* ; leaves thin, revolute at the margins ; flowers from whitish to violet ; pods deeply waved on both sutures. On dry open rocks within the lines of fortification of Pungo Andongo, near Luxillo ; fl. and fr. May 1857, rare. No. **2160**.

2. **M. dimorpha** O. Kuntze, Rev. Gen. Pl. i. p. 198 (1891).

Desmodium dimorphum Welw., *l.c.*, p. 161.

Golungo Alto.—A herb, sometimes an undershrub, 1 to 2½ ft. high, pale-green or glaucous-ashy, branched from the base ; root perennial ; stem sometimes simple below with branchlets at the apex, at other times stems elongated quite simple ; leaves in some cases unifoliolate, at other times trifoliolate ; leaflets usually folded, wonderfully variable as to indumentum, ½ to 1⅔ in. long by ¼ to $\frac{7}{10}$ in. broad. On the rather elevated and dry hills of Sobato de Bumba, at an elevation of 2400 ft.; fl. and fr. May 1856. No. **2161**.

Pungo Andongo.—In gravelly thinly-bushy places between Quitage and Bumba ; fl. and fr. March 1857. Leaflets 1 to 2 in. long. No. **2164**. A perennial herb ; stems thin, crowded, a palm high ; leaves on some forms all unifoliolate, on other forms the lower ones unifoliolate and the upper trifoliolate, the two forms being crowded together ; leaflets ⅓ to 1¼ in. long. On shortly-grassy slopes of the mountains of Serra de Pedras de Guinga ; fl. and fr. March 1857. No. **2165**.

Huilla.—A perennial herb ; stems decumbent-erect, scarcely a foot high ; leaflets ½ to 1 in. long ; flowers white. In pastures with short bushes and dense herbage, Lopollo ; fl. and fr. Nov. 1859 and one specimen in Feb. 1860. No. **2163**.

Var. *β.* **argyrea** (Welw. ex Baker, *l.c.*)

Huilla.—Stem and petioles silvery-silky ; leaflets 1½ to 2¼ in. long. In stony thickets along the borders of forests between Catumba and Ohay, in the camp of 15,000 Monanos ; in early fl. May 1860. No. **2162**.

This species is met with throughout nearly the whole of Angola, but is said to be nowhere abundant ; it occurs also in the Mozambique district and in the island of Madagascar.

3. **M. gangetica** O. Kuntze, Rev. Gen. Pl. i. p. 196 (1891).

Desmodium gangeticum DC. Prodr. ii. p. 327 (1825); Baker, *l.c.*, p. 161.

Golungo Alto.—A small shrub, 3 to 3½ ft. high ; branches spreading, elongate-virgate ; flowers violet-coloured. At the bushy borders of the mountainous forest of Mata de Quisucula, about Bango Aquitamba ; fl. and fr. April 1856. No. **2159**.

4. **M. lasiocarpa** O. Kuntze, Rev. Gen. Pl. i. p. 196 (1891).
Desmodium lasiocarpum DC. Prodr. ii. p. 328 (1825); Baker, *l.c.*, p. 162.

Golungo Alto.—An erect shrub, usually 3 to 4 ft. high; branches sometimes nearly erect and firm, at other times weak and spreading; flowers violet-coloured; abundant in secondary thickets by the roadside between Trombeta and Cambondo; fl. and young fr. Sept. 1854. An erect shrub, 3 ft. high; stems gregarious, erect, sparingly branched; at the borders of the dampish forests of Sange, near Camilungo, at an elevation of 2400 ft.; fl. April 1855 and 1856. A form with the leaves attenuate not cordate at the base. A shrub, 3 to 5 ft. high; branches erect, virgate; flowers of a deep-violet colour; abundant, in secondary thickets, both in damp and very dry spots, near Bango Aquitamba; fl. and fr. June 1856. No. **2157**.

The following No. was referred by Baker, *l.c.*, p. 162, to *M. gangetica*; but it was considered by Welwitsch a variety of *M. lasiocarpa*, with the leaves attenuate at the base; the leaves are obscurely repand and not quite entire:—

Prince's Island.—On the lower wooded slopes of the mountain called Pico de Papagaio; fl. and fr. Sept. 1853. No. **2158**.

5. **M. adscendens** O. Kuntze, Rev. Gen. Pl. i. p. 195 (1891).
Desmodium adscendens DC. Prodr. ii. p. 332 (1825); Baker, *l.c.*, p. 162 (*ascendens*).

Huilla.—Perennial; habit and mode of growth like those of some species of *Medicago*; root many-headed; stems slender, 2 to 3 ft. long, decumbent, from the base up to the apex beset with crowded subdistichous slenderer branchlets which bear shoots at the apex: flowers from orange to purple; pods when thoroughly ripe in the living state yellowish. In damp sandy pastures and marshy thickets alongside streams, as for example the Quipumpunhime, and on the road from Ferrão da Sola to Jâu; fl. and ripe fr. beginning of April 1860. No. **2153**.

6. **M. hirta** O. Kuntze, Rev. Gen. Pl. i. p. 198 (1891).
Desmodium hirtum Guill. et Perr. in Guill. Perr. et A. Rich. Fl. Seneg. Tent. (i.) p. 209 (1833); Baker, *l.c.*, p. 163.

Golungo Alto.—A perennial herb, prostrate, rooting; flowering shoots ascending; flowers violet-coloured. In damp spongy places and alongside streams, near the springs of Capopa near Sange, and Sobato de Quilombo, common; fairly abundant in marshy and shaded places covering extensive tracts and somewhat resembling clover, but then permanently short and rarely flowering; fl. and fr. Feb., March and July 1854 and 1855. No. **2150**. Joints of the pod almost orbicular. In marshy primitive forests, Sobato de Mussengue; fl. and fr. Jan. 1856. No. **2152**. A perennial, much-branched herb; branches elongated, sub-sarmentose, climbing among bushes; stems 3 to 4 ft. long, weak, purple, but on account of the shaggy indumentum turning ashy, as also the leaves, in the living state; flowers small, rose-violet and variegated with white. In marshy places, swamps and ditches at the banks of streams along the Ambaca road, about a league and a half from Sange; fl. and fr. beginning of June 1856. No. **2154**.

Prince's Island.—Along rivulets in shady places, at the foot of Pico de Papagaio, at about 8000 ft. alt., in company with *Caladium bicolor* Vent.; without either fl. or fr. Sept. 1853. No. **2151**.

I have followed Baker's determinations of Nos. 2150—2154, as referred to this and the former species, not having seen the types of either of the two species ; Welwitsch had regarded Nos. 2150, 2151 as one species, and each of the remaining Nos. as distinct species ; Nos. 2150, 2151 certainly appear to belong together, and the fruit of No. 2150 has the upper suture nearly straight, while in Nos. 2152—2154 it is rather waved.

7. **M. incana** Vail in Bull. Torrey Bot. Club, xix. p. 118 (1892). *Desmodium incanum* DC. Prodr. ii. p. 332 (1825); Baker, *l.c.*, p. 163. *M. adscendens*, var. *incana* O. Kuntze, Rev. Gen. Pl. i. p. 195 (1891).

Prince's Island.—A small shrub, 1½ to 2½ ft. high ; branches divaricate or rather erect ; flowers rose-coloured. In stony exposed parts of the maritime region of the island, near S. Antonio ; fl. and fr. Sept. 1853. No. **2149**.

8. **M. mauritiana** O. Kuntze, Rev. Gen. Pl. i. p. 198 (1891). *Desmodium mauritianum* DC. Prodr. ii. p. 334 (1825); Baker, *l.c.*, p. 164.

Golungo Alto.—An undershrub of 1 to 1½ ft. or rarely a shrub of 2 to 3 ft. ; flowers whitish or whitish-violet. On sparingly bushy hills between Undelle and Cambondo and near Camilungo ; fl. and fr. Sept. 1854, Feb. and April 1855, March 1856. No. **2146**.

9. **M. repanda** O. Kuntze, Rev. Gen. Pl. i. p. 197 (1891). *Desmodium Scalpe* DC. Prodr. ii. p. 334 (1825); Baker, *l.c.*, p. 164.

Golungo Alto.—A slender undershrub ; stem far-creeping, becoming woody ; flowers yellow and variegated with bright scarlet, on some forms of the plant wholly red and beautiful but very caducous. In the damp shady woods of Mata de Quibanga, but not abundant, and in Serra de Alto Queta ; fl. and young fr. end of May 1855 and in June 1856. No. **2155**.

Huilla.—Flowers larger than in the last number, scarlet, quickly turning violet. In shady damp woods at the cataract above Lopollo near Ferrão da Sola, in company with species of *Eriocaulon* and *Utricularia* ; fl. and young fr. Jan. and Feb. 1860. No. **2156**.

Bumbo.—Alongside streams in the shaded parts of Serra de Xella, in company with *Pteris cretica* L. and *P. longifolia* L. ; fl. and young fr. Oct. 1859. No. **2156***b*.

10. **M. oxybractea** O. Kuntze, Rev. Gen. Pl. i. p. 198 (1891). *Desmodium oxybracteum* DC. Prodr. ii. p. 334 (1825); Baker, Fl. Maurit. p. 74 (1877). *D. paleaceum* Guill. et Perr. Fl. Seneg. Tent. i. p. 209 (1833); Baker in Oliv. Fl. Trop. Afr. ii. 166, cum syn. *M. paleacea* O. Kuntze, *l.c.*, non Kurz.

Golungo Alto.—An undershrub or suffrutescent herb, 3 to 4½ ft. high, loosely branched from the base ; flowers reddish. Frequent along the bushy banks of the rivulet Quiapose, near Sange, and by other streams, in company with species of *Jussiæa* and *Pteris* amongst tall herbage ; fl. and fr. April 1856. No. **2147**.

Var. **obtusifolia** (Welw. ms. in Herb.).

Leaflets oval or obtusely ovate, 1 to 2½ in. long by ½ to 1½ in. broad ; legumes glabrescent or nearly so, separating at maturity into transversely truncate divisions.

Golungo Alto.—An undershrub, or rather a robust herb, 2 to 3 ft. high. Along the banks of the river Muria, in the bush near Trombeta; fr. Sept. 1854. No. **2148**. An erect undershrub, becoming woody at the base, 3 to 5 ft. high; leaves trifoliolate; racemes pyramidal, with small flowers. In spongy thickets near Sange, at the stream Quiapoze; fr. with good seeds June 1857. Coll. Carp. 444.

11. **M. huillensis** Hiern, sp. n.

Desmodium huillensis Welw. ms. in Herb.

A perennial herb of 2 to 4 ft. or an undershrub of 4 to 7 ft., woody at the base; stems strict nearly simple or with rather spreading virgate branches, reddish beneath the whitish pubescence, terete below; leaves unifoliate, erect-patent, pale-green, hoary, lanceolate, pointed at the apex, rounded or slightly cordate at the base, rigid, usually folded inwards along the midrib, $2\frac{1}{2}$ to 4 in. long by $\frac{1}{3}$ to $\frac{3}{5}$ in. broad when opened flat; petiole broadly winged, $\frac{1}{8}$ to $\frac{1}{2}$ in. long, wings foliaceous, of the same colour, texture and surface as the leaf, terminating upwards with a stipelliform narrow apiculus; stipules narrowly lanceolate, $\frac{1}{6}$ to $\frac{1}{5}$ in. long, deciduous; racemes terminal and axillary, strict, apparently forming a pyramidal panicle; flowers $\frac{3}{4}$ to 1 in. long; pedicels ranging up to $\frac{1}{2}$ in. long, pubescent, bracteate at the base, solitary or a few together; calyx $\frac{1}{3}$ to $\frac{3}{8}$ in. long, campanulate, ebracteolate, pubescent, bilabiate; the upper lip ovate, acute, minutely bidentate at the tip; the lower lip rather exceeding the upper lip, deeply trifid, lobes ovate acute, the lowest outermost and longest each rather narrower than the upper lip; standard of a dirty-blue colour, obovate-orbicular, in flower patent reclinate folded backwards, longitudinally striate, not quite glabrous on the back, with a short broad channelled claw; wing-petals deep blue, obliquely oval, ascending, shorter than the standard and keel, somewhat adhering to the keel; keel greenish-blue, boat-shaped, rather blunt; stamens diadelphous; the axillary stamen free at the base and apex; 5 of the remaining 9 stamens with oblong uniform anthers on short stalks; 4 stamens with abortive anthers which consist of elliptical white membranes embracing the intervening perfect anthers; ovary stipitate, compressed, linear, 6-ovuled, girt at the base of the stipes with a thin rather tall disk, densely hairy at the edges, glabrous on the two faces; style rather compressed, sub-glabrous, filiform; stigma small, capitate; pod an inch long or longer, densely shaggy, on a long shaggy stipes of 1 to $1\frac{1}{4}$ in.; joints 4 or 5, elliptical, narrowed on both ends, with a shaggy golden-yellow tomentum appressed on the faces and spreading at the margins.

Huilla.—Very abundant on rather dry sparingly bushy hills between Lopollo and Ferrão da Sola, at an elevation of about 5000 ft.; rather rarely flowering; fl. and young fr. 17 March 1860. No. **2167**.

12. **M. megalantha.**

Desmodium megalanthum Taub. in Engl. Bot. Jahrb. xxiii. p. 192 (1896).

A perennial herb; root woody, several-headed; stems gregarious,

erect, 7 to 14 in. high, obtusely angular, of a pale colour, sparingly pilose or glabrate; leaves unifoliolate, erect or ascending, oval-oblong, obtuse and shortly apiculate at the apex, rounded or very slightly cordate at the base, 2 to 4 in. long by $\frac{2}{5}$ to $\frac{4}{5}$ in. wide, margins narrowly revolute, glabrescent, or often the midrib appressedly pilose beneath; petiole $\frac{1}{4}$ to $\frac{4}{5}$ in. long, broadly winged in an obovate manner with stipelliform subulate or needle-shaped stipels at the apex; stipules lanceolate striate rigid $\frac{1}{4}$ to $\frac{1}{3}$ in. long, reddish-brown in the dry state; flowers axillary and sub-terminal, solitary or a few together, about $\frac{3}{5}$ to $\frac{3}{4}$ in. long, pale purple, handsome, in terminal somewhat leafy racemes; pedicels $\frac{1}{4}$ to $\frac{1}{2}$ in. long, somewhat pubescent; bracts ovate-subulate, ciliate, $\frac{1}{8}$ in. long, deciduous; calyx campanulate, $\frac{1}{4}$ to $\frac{1}{3}$ in. long, somewhat pubescent, widely bilabiate, the upper lip bidentate at the apex with subulate teeth, the lower lip trifid rather longer than the upper lip with ovate acuminate teeth; corolla glabrous or nearly so; standard orbicular-obovate, wing-petals somewhat adhering to the keel; filament of the vexillary stamen free for half its length from the staminal tube; ovary shortly stipitate; pod about 2-jointed, $\frac{3}{4}$ to 1 in. long, pale tawny, shaggy-tomentose, about 2-seeded; stipes straight or curved, pale tawny, shaggy-tomentose, 1 in. long more or less.

Huilla.—In thickets alongside forests in somewhat sandy places, from Mumpulla towards Nene and Humpata, not scarce but local; fl. and fr. Oct. 1859. No. **2166**.

This species as well as the last is related to the East Indian species *M. triquetra* O. K. of the section Pteroloma; it occurs also at Caconda farther in the interior of Angola, having been collected there by Anchieta, who gives for its local name "Xicucu." It is nearly related also to *M. Stuhlmannii* (*Desmodium Stuhlmannii* Taub. in Engl. Pflanz. Ost-Afrika, C. p. 217 (1895).

26. **PSEUDARTHRIA** Wight & Arn.; Benth. & Hook. f. Gen. Pl. i. p. 521.

1. **P. macrophylla** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 168.

Huilla.—Stem 3 to 4 ft. high, wholly herbaceous, erect, somewhat furrowed, shaggy or loosely tomentose; leaflets on the upper part of the stem acutely pointed at the apex; flowers purple; pods never constricted, shorter and broader than in *P. Hookeri* Wight & Arn. Sporadic, at the skirts of the forests near the great lake of Ivantâla, along the river Cacolovar, at an elevation of 5000 ft.; fl. and fr. end of Feb. 1860. No. **2144**. Suffruticose; fr. June 1860. Coll. Carp. 537. Cf. Coll. Carp. 467.

This plant is possibly, as Welwitsch himself suspected, a form of *P. Hookeri* W. & A.

2. **P. Hookeri** Wight & Arn. Prodr. Fl. Ind. p. 209 (1834); Baker, *l.c.*, p. 168.

Anarthrosyne robusta E. Mey. Comm. Pl. Afr. Austr. Dreg. p. 125 (1836). *A. densiflora* Kl. in Peters Mossamb. Bot. i. p. 41 (1861).

Golungo Alto.—A herb (or undershrub), 3 to 4 ft. high; stem erect, with many deep furrows, shortly tomentose, branched in a

pyramidal manner towards the apex; flowers violet-purple. Not uncommon on the higher slopes of Serra de Alto Queta, in damp places, among species of *Andropogon* and *Pennisetum*; fl. and fr. May 1856. No. **2142**.

Pungo Andongo.—A robust herb, 3 to 4 ft. high, erect; stem simple in the more robust individuals, loosely branched towards the apex; leaflets broadly or obscurely crenate; flowers purple, sometimes violet, very rarely whitish; pods quite continuous inside. Common, in elevated damp secondary thickets by streams near Caghuy within the lines of fortification; fl. Feb. fr. April and May 1857. No. **2143**.

3. **P. crenata** Welw. ms. in Herb.

An erect herb, 2 to $2\frac{1}{2}$ ft. high, scarcely branched up to the inflorescence; stem furrowed, hispid-pubescent, rigid, reddish-brown; leaves trifoliolate or the uppermost simple by abortion, shortly petiolate, rather longer than the internodes; petiole shaggy, $\frac{1}{8}$ in. long; stipules narrowly linear-lanceolate, $\frac{1}{3}$ to $\frac{1}{2}$ in. long; leaflets oval-elongate, cuspidate-apiculate, subglabrous and rather glossy above, pubescent beneath, the lateral leaflets subsessile 2 to 3 by $\frac{1}{3}$ to $\frac{5}{8}$ in., the terminal leaflet 3 to 4 by $\frac{2}{3}$ to $\frac{3}{4}$ in. on a petiolule of about $\frac{1}{8}$ in.; stipels similar to the stipules but not half the size, deciduous; inflorescence terminal, erect, rather lax, half the length of the plant; racemes arranged in a pyramidal manner; flowers purple, $\frac{1}{4}$ to $\frac{1}{3}$ in. long, on slender thinly pubescent pedicels ranging up to $\frac{1}{2}$ in. fascicled a few together; calyx half the length of the flower, thinly pubescent; upper lip bidentate, lower lip trifid; stamens diadelphous, vexillary stamen free; anthers uniform, short, obtuse; ovary pilose, linear-oblong, curved at the apex; pods linear-oblong, 1 to $1\frac{1}{2}$ in. long by $\frac{1}{4}$ to $\frac{1}{3}$ in. broad, flatly compressed, shortly pubescent at least on the crenate margins, not articulated, about 5-8-seeded.

Huilla.—In bushy places with tall herbage at the borders of forests, along the river Cacolovar, near the great lake of Ivantâla; fl. and fr. end of Feb. 1860. No. **2145**.

27. **URARIA** Desv.; Benth. & Hook. f. Gen. Pl. i. p. 521.

1. **U. picta** DC. Prodr. ii. p. 324 (1825); Baker in Oliv. Fl. Trop. Afr. ii. p. 169; Ficalho, Pl. Uteis, p. 139 (1884).

Golungo Alto.—A very rough tenacious herb, scarcely shrubby, 2 to 8 ft. high, sometimes erect, at other times sarmentose-decumbent or obliquely ascending or climbing amongst bushes; rootstock woody, very tenacious, oblique, 2 to 4 ft. long, thickened in a fusiform manner, fibrous inside but remaining juicy, in much repute with the negroes of this region as an aphrodisiac; leaves rigid; leaflets 1 to 9, usually 7, subcordate at the base; petals rose-coloured or violet, fugacious; pod moniliform, with 3 to 7 circular pearly obliquely placed joints, the extreme one bearing the long persistent flaccid style. In thickets alongside primitive forests, here and there throughout the district, as for instance near Sange and at Mussengue: fl. April and May 1855, and July and August 1856; without fl. beginning of December 1855: fr. August 1856. Native name "Caiala camoxe," or "Camoxo-caiala," that is, "always a boy." No. **2111**.

Ambaca.—A herb apparently perennial, in some cases scarcely a foot

high, in other cases ranging up to 7 ft. and half-climbing amidst shrubs ; flowers rose-coloured. In bushy places near Izonga ; fl. Oct. 1856. No. **2111***b*.

28. **FABRICIA** Scop. Introduct. p. 307 (1777); non Thunb. (1779), nec Gaertn. (1788), nec Adans. (1763). *Alysicarpus* Neck. (1790); Benth. & Hook. f. Gen. Pl. i. p. 522.

1. **F. nummulariæfolia** O. Kuntze, Rev. Gen. Pl. i. p. 181 (1891).
Hedysarum nummularifolium L. Sp. Pl. edit. 1, p. 746 (1753). *H. vaginale* L., *l.c.* *Alysicarpus nummularifolius* DC. Prodr. ii. p. 353 (1825). *A. vaginalis* DC., *l.c.*; Baker in Oliv. Fl. Trop. Afr. ii. p. 170.

Ambriz.—A perennial herb, with cæspitose prostrate-ascending stems. On gravelly hills near Ambriz ; fl. and fr. Nov. 1853. No. **2128**.

Loanda.—Alto das Cruzes, in grassy hills, pretty frequent ; fl. and fr. May 1854. Pods in the living state sub-cylindrical, remarkably thickened in the upper part, joints always rectangular, not moniliform nor constricted ; very common on shortly-grassy pastures near the ocean between Sambe grande and Cabolombo ; fl. and fr. 30 July 1854. Imbondeiro dos Lobos ; fl. and fr. April 1858. No. **2129**. A low undershrub, with prostrate branches and inconspicuous violet-coloured flowers. Habit of *Indigofera*, but the leaves simple. Alto das Cruzes. Fr. Coll. Carp. 378.

Ambaca.—A perennial herb, prostrate, glaucous, with many stems and white flowers ; a shore plant, not seen in the mountain-wooded region. In rather dry flat places near N-gombe ; fl. and fr. Oct. 1856. No. **2130**.

2. **F. Zeyheri** O. Kuntze, Rev. Gen. Pl. i. p. 182 (1891).
Alysicarpus Zeyheri Harv. in Harv. et Sond. Fl. Cap. ii. p. 230 (1862); Baker, *l.c.*, p. 170.

Huilla.—A perennial herb with the habit and mode of growth of the previous species, but with deeply sulcate stipules, calyx-lobes densely and long ciliate, and pod-joints moniliform not straight. Plentiful in the higher marshy pastures of Empalanca with short herbage flooded in the rainy season, at an elevation of 5500 ft. ; fl. and fr. end of April 1860. No. **2131**.

3. **F. porrecta** O. Kuntze, Rev. Gen. Pl. i. p. 182 (1891).
Alysicarpus porrectus Welw. ex Baker, *l.c.*, p. 171.

Loanda.—An annual herb with a smooth stem branched from the base ; branches rather spreading, virgate ; stipules nearly twice the length of the petiole ; calyx-lobes divided down to the base ; narrower than the other species, not imbricated by their margins at the base ; pods much longer than the calyx ; joints 6, orbicular, glabrous, transversely wrinkled, wrinkles flexuous acute anastomosing in the middle. Rather common at the grassy margins of pools (represas) nearly dried up at the time, near Quicuxe ; fl. and fr. April 1854. No. **2134**.

4. **F. rugosa** O. Kuntze, Rev. Gen. Pl. i. p. 182 (1891).
Alysicarpus rugosus DC. Prodr. ii. p. 353 (1825); Baker, *l.c.*, p. 171.

Ambaca.—An annual herb ; stems virgate ascending ; flowers whitish : calyx scarious, rigid, striate, rose-purplish or whitish ; pod included, moniliform, with transversely oblong and wrinkled joints, the last joint empty, acuminated. Rather rare, in sandy places along

the banks of the river Lucala; fl. and fr. Oct. 1856. No. **2132**. In shortly grassy places, flooded in the rainy season, at the left bank of the river Caringa; fl. and ripe fr. June 1855. No. **2132***b*.

Pungo Andongo.—A perennial (?) herb, growing in a cæspitose manner with a many-headed rootstock and numerous ascending stems; flowers whitish; pod but little longer than the calyx, joints transversely wrinkled, glabrescent. Frequent in bushy damp pastures near Pedras de Guinga; fl. and fr. Jan. 1857. No. **2133**. In damp meadows near the rivulet Luxillo; fl. and fr. Feb. 1857. No. **2133***b*. Pedras de Guinga; fl. No. **5179**.

29. **CICER** L.; Benth. & Hook. f. Gen. Pl. i. p. 524.

1. **C. arietinum** L. Sp. Pl. edit. 1, p. 738 (1753); Baker in Oliv. Fl. Trop. Afr. ii. p. 172; Ficalho, Pl. Uteis, p. 139 (1884).

Mossamedes.—Cultivated in fields about Cavalleiros, where it had been introduced from Portugal in the year 1853; in company with casual specimens of *Pisum sativum* L.; not yet fl. August 1859. Also occasionally wild at the banks of the river Bero; without fl. July 1859. Portuguese name "Graõ de bico." No. **2245**.

30. **LATHYRUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 526.

1. **L. sativus** L. Sp. Pl. edit. 1, p. 730 (1753); Baker in Oliv. Fl. Trop. Afr. ii. p. 174; Ficalho, Pl. Uteis, p. 139 (1884).

Mossamedes.—Sporadic, in fields of *Cicer arietinum* L., near Cavalleiros, probably introduced with seeds of *Cicer* from Portugal, but cultivated nowhere in Angola; fl. and fr. August 1859. No. **2244**.

Pisum sativum L. Sp. Pl. edit. 1, p. 727 (1753); Welw. Apont. p. 573; Baker in Oliv. Fl. Trop. Afr. ii. p. 174, in note; Ficalho, Pl. Uteis, p. 139 (1884).

Golungo Alto.—Commonly cultivated throughout Angola, and occasionally wild. Quibolo, near Sange; fl. July 1856. No. **2243**.

31. **ABRUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 527.

1. **A. precatorius** L. Syst. Nat. Edit. 12, ii. p. 472 (1767); Welw. Apont. p. 586, n. 27; Baker in Oliv. Fl. Trop. Afr. ii. p. 175; Ficalho, Pl. Uteis, p. 140 (1884).

Sierra Leone.—By thickets in mountainous situations near Freetown; fr. Sept. 1853. No. **2246**.

Loanda.—Sporadic but quite spontaneous alongside thickets, in sandy places, in company with *Cienfuegosia pentaphylla* (Welw. Herb. 5221), near Penedo; fl. and ripe fr. March and April 1854. No. **2247**.

Libongo.—A little shrub, 5 to 6 ft. high; branches sarmentose, climbing, twining; flowers purplish; quite spontaneous, apparently indigenous, in dense shrubby places between Banza de Libongo and Bombo; fr. Sept. 1858. No. **2247***b*. Coll. Carp. 398.

Golungo Alto.—A rigid twining shrub, 3 to 5 ft. high, often hardwoody at the base; flowering axis very rigid; flowers violet-purple. Called by the Cabundo negroes "Fingo gifingo." If not really indigenous, the plant must have been introduced in the early ages. In forests, often in places hitherto untouched by cultivation, along streams throughout the district, but always sporadic. By the Quiapoze

stream near Sange, and by the Banza de Quilombo ; ripe fr. June 1856. No. **2248**.

2. **A. canescens** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 175.

Cazengo.—An undershrub, 3 to 4 ft. high, clothed with appressed pubescence throughout, much branched, with long weak twining or intricate branchlets ; young leaves with a silvery lustre, adult leaves of different colours on the two surfaces, pubescent on both surfaces, hoary beneath ; leaflets 16 to 22 ; pods compressed, yellowish-green, mostly 6-8-seeded, not seen fully ripe, $1\frac{1}{2}$ to $1\frac{3}{4}$ in. long by $\frac{1}{3}$ to $\frac{3}{8}$ in. broad. In dense thickets along the banks of the river Mŏĕmbēgĕ, near Dalatanda ; fr. June 1855, at an elevation of 2000 ft. No. **2249**.

Pungo Andongo.—A weak slender widely climbing undershrub ; branches thin ; flowering branchlets very long, virgate-sarmentose, more or less hoary-pubescent as also the leaves and bracts ; leaflets 20 to 26 ; flowers arranged on a not thickened axis in remote spurious whorls, of a deep-violet-purple colour : pods $1\frac{2}{3}$ to 2 in. long, $\frac{2}{5}$ to $\frac{5}{12}$ in. broad, compressed, about 8-seeded, yellowish-brown in the living state, appressedly pubescent, not seen fully ripe. In rocky bushy places along the base of the gigantic rocks of Pungo Andongo fortress, near Canandua and near the road leading to Cambonde, rather rare ; fl. and young fr. April 1857, at an elevation of 3800 ft. No. **2250**.

Baker, *l.c.*, p. 176, regarded the Cazengo plant as probably a different but closely allied species.

32. **CLITORIA** Dillen., L. ; Benth. & Hook. f. Gen. Pl. i. p. 528.

1. **C. Ternatea** L. Sp. Pl. edit. 1, p. 753 (1753) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 177. Cf. *Robiniacea*, Welw. Apont. p. 590, no. 36.

Loanda.—An apparently annual herb ; stem at first erect, here and there twining from the sarmentose branched base ; flowers large white ; frequent in dried up clayey fields flooded in the summer, between the city of Loanda and Quicuxe ; fl. and fr. July and Dec. 1858. An undershrub, woody at the base ; stem abbreviated ; branches virgate-elongated, twining ; pods whitish, chartaceous, linear, rather compressed, somewhat torulose between the seeds ; between Teba and Quicuxe ; fr. July and August 1858. A herb, apparently lasting for several years but scarcely perennial, sometimes prostrate but mostly scandent ; flowers whitish with a very pale-yellow tinge ; calyx bi-bracteolate, tubular, gradually dilated, at the base with 5 prominent thick nerves, gibbous, equally and deeply 5-cleft ; standard large, much exceeding the wing-petals and keel : stamens 10, diadelphous ; ovary elongate-oblong, softly pilose ; style rather compressed, sigmoid-curved at the base, bearded below at the apex ; in rather dry sandy places, near Maianga do Povo and de El Rei, climbing on species of *Euphorbia* and *Rhipsalis* ; fl. end of Dec. 1858. No. **2215**. An undershrub ; flowers whitish, handsome. A form with narrow leaves. On plains flooded in the rainy season, near Quicuxe ; fl. and fr. June 1854. No. **2215***b*. An annual or biennial herb ; stem branched, twiggy ; leaves pinnate ; flowers large, white. In fields after a crop of maize ; Quicuxe, fr. June 1860. Coll. Carp. 458.

Barra do Bengo.—A heterophyllous form. In bushy places at the banks of the river Bengo, near S. Antonio ; fl. and fr. Dec. 1853. No. **2216**.

Golungo Alto.—On bushy hills, on a red-clay soil, near Sange, fl. and fr. May 1855 and August 1857. No. **2217**.

33. **GLYCINE** L.; Benth. & Hook. f. Gen. Pl. i. p. 530.

1. **G. javanica** L. Sp. Pl. edit. 1, p. 754 (1753); Baker in Oliv. Fl. Trop. Afr. ii. p. 178.

Huilla.—A twining, widely-climbing herb; leaflets rather thick, velvety-tomentose beneath; flowers white, marcescent, quickly turning reddish-brown; calyx-lobes long-pilose-ciliate; pods vesicular-inflated, many-seeded. In bushy pastures, about Lopollo, by the path leading to the forest; fl. and young fr. middle and 23 March 1860. No. **2190**.

Var. *β*. **longicauda** Baker, *l.c.*

Golungo Alto.—A widely-climbing undershrub, with whitish flowers. In thickets, along the left bank of the rivulet Delamboa, infested with *Bridelia*, etc., and at the margins of forests about Sange; fl. and fr. from March to July 1855. No. **2185**. Herbaceous, climbing; stem twining; pods racemose; near Aldea de Golungo Alto, in hot situations; fr. Oct. 1854. Coll. Carp. 534.

2. **G. micans** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 179.

Golungo Alto.—A suffrutescent herb, very widely climbing; leaflets in the living state silvery-silky-pilose, shining, flowers whitish. Abundant, at the borders of the damp woods of Sobato Mussengue; fl. and young fr. Oct. 1855. No. **2186**.

3. **G. andongensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 179.

Pungo Andongo.—An undershrub, climbing to a considerable height; flowers whitish, turning tawny in the drying. Rather rare, seen only near Luxillo, at the borders of forests; fl. April 1857. No. **2189**.

The following No., without flowers or fruits in the British Museum set, differs from the last species by narrower and longer mucronulate leaflets (2 to 3 by $\frac{1}{2}$ to 1 in.):—

Golungo Alto.—A twining slender suffrutescent herb, climbing far; flowers not seen in a good state of development, apparently red or whitish; young pods sub-falcate, densely rigidly hirsute. Sparingly, by thickets at the river Cuango, near Undelle; beginning of April 1856. No. **2188**.

4. **G. hedysaroides** Willd. Sp. Pl. iii. p. 1060; Baker, *l.c.*, p. 179.

Loanda.—An undershrub; stem below hard-woody, slender, branched at the height of half a foot; branches elongated, 1 to 3 ft. long, scandent; leaves trifoliolate; flowers axillary, small, white; stamens monadelphous; anthers all alike; pods bivalved, 4-5-seeded, cellulose-septate between the seeds; seeds sub-uniform, dark brown. In neglected fields near Quicuxe, Cacuaco and Teba, on the left bank of the river Zenza; fl. and ripe fr. July 1854. No. **2214**.

34. **TERAMNUS** P. Br.; Benth. & Hook. f. Gen. Pl. i. p. 530.

1. **T. labialis** Spreng. Syst. Veg. iii. p. 235 (1826); Baker in Oliv. Fl. Trop. Afr. ii. p. 180.

Ambriz.—An intricate-scandent herb, with small whitish flowers. In exposed places formerly cultivated and at the time neglected, in the forest near Mubango; fl. without fr. Nov. 1853. No. **2213**.

Golungo.—Sporadic, by thickets near Bango-Aquitamba, at an elevation of 2400 ft.; fl. April 1855. No. **2187**.

Cazengo.—Twining on *Hugonia* (cf. Welw. Herb. No. 1585), at the base of Serra de Muxaulo; ripe fr. June 1855. No. **2187***b*.

35. **ERYTHRINA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 531.

1. **E. suberifera** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 183 ; Ficalho, Pl. Uteis, p. 140.

Erythrina suberosa Welw. Synopse, p. 30, n. 73; non Roxb. *Corallodendron suberifera* O. Kuntze, Rev. Gen. Pl. i. p. 173 (1891).

Golungo Alto.—A tree, 15 to 25 ft. high ; trunk 12 to 20 in. in diam. at the base ; bark thickly corky, cracked; branches spreading irregularly or patent ; calyx spathaceous, clothed with a cinnabar-red tomentum, 5-cleft at the apex ; lobes obovate-spathulate ; standard twice as long as the calyx ; pods 2 to 2½ in. long, cylindrical-compressed, deeply torulose, quickly dehiscent. Abundant at the borders of primitive forests as a tree, and formerly cultivated as a small tree of 5 to 8 ft. or even as a shrub of 3 to 4 ft., in secondary thickets and reed-beds. Flowers twice in a year, namely in April and Sept. The trunk resists the most vehement forest-fires, sending out after the occurrence of rain leafy and flowering shoots from the trunk burnt nearly to the heart. A very splendid species, much recommended to horticulturists. Native name, "Molungo." In the forests of Sobato de Mussengue, as vast trees, in ripe fr. Oct. 1854 ; fl. and young fr. April 1856. No. **2230**. In rather open forests along the banks of the stream Cuango, and neighbourhood ; young fr. July 1855. No. **2229**. Bark whitish-chestnut, corky ; flowers deep red-scarlet ; pods dehiscent ; seeds scarlet, with a black oblong umbilicus. Canguerange : fr. Oct. 1854. Coll. Carp. 399. Between Sange and Mussengue ; fr. June and August 1856 and 1857. Coll. Carp. 400, 401, and (a specimen of the wood) 950.

The Molungo is a small tree, very common on the stony slopes of the interior districts of Angola, especially in Cazengo, Golungo Alto and Ambaca ; it is distinguished among all the rest of the trees of this region by its corky bark, resembling that of the cork-oak of Portugal, with which however it has nothing more in common. Both the bark of this tree and its root are reputed by the natives as an efficacious remedy for secondary syphilis in the form of a decoction, the same virtues being attributed to it as to sarsaparilla. See Welw. Synopse, p. 30 n. 73.

2. **E. huillensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 183.

Corallodendron huillense O. Kuntze, *l.c.*, p, 173.

Huilla.—A small tree, 8 to 15 ft. high, patently branched; bark not corky, rather smooth ; stem and branches whitish, aculeate ; both surfaces of the younger leaves the peduncles and calyces tomentose ; flowers bright-red ; calyx deeply 5-cleft at the apex ; pods moniliform. Sporadic, in mixed primitive forests along the banks of the river Monino, in company with species of Proteaceæ, *Sesban*, etc. ; fl. Dec. 1859, in leaf and fallen fr. April 1860 ; at an elevation of about 5000 ft. No. **2231**. Lopollo ; fr. May 1860. Coll. Carp. 402.

Coll. Carp. 403 is the dehiscent fruit of a tree with deciduous leaves cultivated in the Lisbon botanical garden in August 1861, and is apparently *Erythrina poianthes* Brot., a species which has been long cultivated in Portugal.

36. **STIZOLOBIUM** P. Br. Hist. Jamaic. p. 290 (1756). *Mucuna* Adans. (1763) ; Benth. & Hook. f. Gen. Pl. i. p. 533.

1. **S. urens** Pers. Syn. Pl. ii. p. 299 (1807).

Mucuna urens Medik. in Vorles. Churpf. Phys. Ges. ii. p. 399 (1787) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 185.

GOLUNGO ALTO.—A shrub, climbing to a great height, woody up to a man's height, then herbaceous-sarmentose, armed in all parts except the corolla with stinging hairs; stems more or less twining, tenacious; branchlets slender, pendulous from the head of palms or other trees; flowers umbellate, rather fleshy, sulphur-greenish; pods oblong, pendulous, lamellate, tardily dehiscing, 5 to 7 in. long, 2 to 2½ in. broad, compressed-concave; sides very deeply and obliquely furrowed; crests rigid, interrupted in the middle: sutures deeply and broadly unisulcate; seeds 2 or 3, globose-compressed, black, thinly wrinkled, zoned at four-fifths of their equatorial circuit with a linear umbilicus. A very handsome species, one of the highest ornaments of the primitive forests, on account of its remarkably silvery-glistening leaflets, with rather long-pendulous cymes enveloped when young by very broad oval obtuse bracts, tolerably distinct from all other species of Angola, and highly noteworthy on account of the metamorphosis of the calyx, at first cylindric-tubular, afterwards abbreviated-dilated. In the moist very shady primitive forests of Sobato de Mussengue by the river Delamboa, climbing on Bordaõ (*Raphia* sp.); sparingly fl. Jan. and Feb. 1855, fr. May, June and July 1856. No. **2239**. Flowers cymosely pseudo-umbellate, from yellow to greenish; peduncles pendulous; pods with crowded broad vertically erect transverse plates dentate or erose on their edge, and very deeply sulcate on each suture; seeds orbicular, quite black when ripe, with somewhat impressed points on their faces. In the forests of Mussengue, near the river Delamboa; fl. and ripe fr. Jan., Feb. and May 1856. COLL. CARP. 404.

2. **S. pruriens** Medik. in Vorles. Churpf. Phys. Ges. ii. p. 399 (1787). *Mucuna pruriens* DC. Prodr. ii. p. 405 (1825); Baker, *l.c.*, p. 187; Ficalho, Pl. Uteis, p. 140 (1884).

GOLUNGO ALTO.—An undershrub, climbing far and wide, covered all over, except the corolla, with stinging hairs, flowering and fruiting usually in its first year, but nevertheless at length with the behaviour underground of a perennial plant or, when living amongst reeds or tall species of *Andropogon*, persisting with its stem shrubby at the base; flowers handsome, deep- (almost black-) blue or deep-violet-blue, arranged on half-pendulous racemes; bracts lanceolate, ¼ to $\frac{5}{12}$ in. long, long-acuminate, densely beset with long pilose hairs, deciduous; calyx yellowish-green; upper lip ovate-lanceolate from a broad base; lobes of the lower lip lanceolate, the middle one longer than the others, all much acuminate; standard dark-purple, broadly ovate, scarcely cordate; wing-petals almost twice as long as the standard, dark-purple, spathulate, curved at the base, embracing the keel which is tinged with violet-rose-colour; pod pendulous, about 2½ to 3 in. long, linear, rather compressed, furrowed on the faces along its whole length, dehiscing in a sigmoid-curved manner, when young densely covered with very rigid dark-purple pilose hairs, at length shining and golden-tawny, always stinging badly as do also though in a less degree the hairs of the stem and branches, causing pains which last for days and nights; seeds 4 to 6, black, oval-ellipsoidal, ⅛ to ⅓ in. long, tumid; umbilicus oblong-linear, short for the genus. Native name "Quicuta," which collectively is given to several species but mostly to this; it is the most stinging of the species observed in Angola. Remarkably frequent, in open woods, in neglected spots of previous cultivation, and in rather dry reed-beds; also not uncommon at the bushy margins of primitive forests; Serra de Alto Queta, Sobato de Mussengue, Sange, etc.; fl. at different parts of the year according to soil and position, May 1855, end of March and

April 1856; young fr. May 1855; ripe fr. April, May and July 1856. No. **2238**. In reed-beds near Trombeta among *Andropogon* sp. A winter form, flowering and fruiting a second time, June 1855. No. **2238***b*.

Golungo and Cazengo.—Pods unisulcate on their faces; furrows longitudinal or rather marked along with a winged-shaped rib. Called "Quicuta azul." Coll. Carp. 406. Apparently fruits of the same species from tropical America. Coll. Carp. 407.

3. **S. stans** O. Kuntze, Rev. Gen. Pl. i. p. 208 (1891).
Mucuna stans Welw. ex Baker, *l.c.*, p. 187.

Pungo Andongo.—A shrub, 5 to 6 ft. high or more, standing erect, much branched from the base; branches erect, virgate, as well as the branchlets erect-patent; leaves evergreen, pinnately trifoliolate, silvery-shining, rather thick, soft, not coriaceous. Neither the stems nor the leaves, nor at length either the calyces or the pods, are of an herbaceous-green colour; flowers blue or dark-purplish, fascicled in a ternate fashion in erect-patent racemes, secund; calyx tubular-campanulate, bilabiate; upper lip shortly cleft; lower lip tridentate, the middle tooth being longer than the other two; standard broadly ovate, repand at the base on both sides of the claw, incumbent on the equally long wing-petals; keel longer than the standard and wings, sub-falcate towards the apex, cartilaginous-rigid, acuminate-pungent as mostly in *Mucuna*; stamens 10, diadelphous; 5 filaments equal; 5 clavate-thickened towards the apex, bearing incumbent circular-ovate anthers, while the anthers of the other stamens are oblong-linear and erect: ovary pilose, elongated-conical; stigma narrowly capitate, very thinly glandular-penicillate. Hairs of the pods stinging rather severely, as in *S. pruriens*. Frequent, in rocky thickets within the lines of fortification, as for example near Cazella and Catete; fl. 14 April 1857, fr. Nov. 1856. No. **2237**. In primitive forests; fr. May 1857. Coll. Carp. 408.

4. **S. Poggei.**
Mucuna Poggei Taub. in Engl. Bot. Jahrb. xxiii. p. 194 (1896).

A shrub, climbing to a great height, pendulous towards the extremities, stinging badly; branches glabrescent; branchlets sub-herbaceous, pilose; leaves pinnately trifoliolate; leaflets obtuse at both ends, cuspidate or apiculate at the apex, somewhat pubescent with appressed hairs above, glistening beneath with appressed hairs; lateral leaflets very obliquely ovate, rounded or somewhat excavated at the base, the lower side broad almost auricled, the whole 3 to $4\frac{1}{2}$ by 2 to $3\frac{1}{2}$ in. on a short pilose petiolule of $\frac{1}{8}$ to $\frac{1}{4}$ in. long stipellate at the base; the central leaflet somewhat rhomboidal or broadly ovate $3\frac{1}{2}$ to $4\frac{1}{4}$ by $2\frac{1}{2}$ to $3\frac{1}{4}$ in., on a petiolule of $\frac{2}{3}$ to $1\frac{1}{3}$ in. articulate and stipellate a little below the top; common petiole $2\frac{1}{2}$ to 5 in. long; racemes about a foot long or more; pedicels $\frac{1}{3}$ to $\frac{2}{3}$ in., often 2 together; flowers numerous, 2 to $3\frac{1}{2}$ in. long, the largest of all Angolan Leguminosæ except *Gigantheumum scandens* Welw., Herb. No. 550, yellowish-green, rather fleshy; calyx very shortly campanulate, almost pan-shaped, sub-bilabiate, fleshy-rigid, beset outside throughout with golden-tawny rigid almost glassy stinging pilose hairs; upper lip shortly bidentate; lower lip obtusely and shortly 3-lobed;

standard oblong, bifid one-third way down from the apex with a very acute sinus, half the length of the keel and wing-petals; claw short, broad, concave; wing-petals obliquely lanceolate, callous at the base, emarginate-bifid; lamina concave; petals of the keel cohering in a ventricose manner, emarginate and unequally 2-lobed below, falcate at the apex, subcartilaginous-rigid, whitish to pale-sulphur-greenish as is also the whole corolla, with an oily gloss and unpleasant smell; ovary hairy; style not twisted; pods without furrows, more or less constricted between the seeds, brown-tomentose.

Golungo Alto.—Not uncommon, in primitive forests and groves of palms ("Die," *Elaeis guineensis* Jacq.), along the banks of the river Delamboa; fl. Feb., fr. June 1856. No. **2240**. Pods 2-4-seeded, oblong or 1-seeded orbicular, hispid, quite obtusely sinuate or crenate-tuberculate on the sutures. Coll. Carp. 409 and 410.

Pungo Andongo.—By the loftier trees along the base of the gigantic rocks of the fortified district of Pungo Andongo, on the south-west, near Musondo; fl. Feb. 1857. A lateral branch of the stem at least 30 ft. long with racemes in flower-bud, 1 Feb. 1857. Also part of the same stem in fl. with fully developed leaves. No. **2241**.

According to Welwitsch this species most resembles *S. ellipticum* Pers., but in that species the flowers are umbellate and the calyx-lobes lanceolate.

37. **PHYSOSTIGMA** Balf.; Benth. & Hook. f. Gen. Pl. i. p. 538.

1. **P. venenosum** Balf. in Trans. Roy. Soc. Edinb. xxii. p. 310, tt. 16, 17 (1861); Baker in Oliv. Fl. Trop. Afr. ii. p. 191.

Old Calabar.—Coll. Carp. 417.

2. **P. cylindrospermum** E. M. Holmes in Pharm. Journ. Ser. III. ix. p. 913 (1879); Trimen in Journ. Bot. 1879, p. 185.

Mucuna cylindrosperma Welw. ex Baker, *l.c.*, p. 186. *Stizolobium cylindrospermum* O. Kuntze, Rev. Gen. Pl. i. p. 208 (1891).

Golungo Alto.—A shrub climbing to a great height, then pendulous with very long twisted twigs; stem and leaves not stinging; peduncle 4 to 6 ft. long, hanging down from a lofty tree; ripe pods racemose, 5 to 7 in. long, 1 to 1¼ in. diam., cylindrical, acuminate at both ends, somewhat ventricose in the middle, with numerous obliquely transverse lamellate scores outside, brownish-grey, not stinging, furrowed along the back, lined inside with a whitish shining quasi-medullary membrane; seeds 2 or usually 3, oblong-cylindrical, 1 to 1¼ in. long, reddish-brown, very hard like stone, impressed along one side with a deep narrow trench along the whole length. Rather rare, in the primitive forests of Mata de Quisucula, near Bango Aquitamba; fr. Oct. 1855. No. **2242**. In the absence of the flowers, the final determination of this plant must remain uncertain. Flagelliform branches attaining 30 to 40 ft., pendulous; leaflets quite glabrous, smooth-glossy, herbaceous; pods 4 to 6 in. long, sub-cylindrical, attenuate-subulate at the apex, gradually attenuate at the base, transversely but rather obliquely rimose, not stinging, 2- or 3- or rarely 1-seeded, a little constricted between the seeds. Native name "Maxima iá muxito." In the primitive forest of Quisuculo, Sobato Bango-Aquitamba, rather rare; fr. 1 to 3 Sept. 1855. Coll. Carp. 405.

38. **DIOCLEA** H. B. & K.; Benth. & Hook. f. Gen. Pl. i. p. 536.

1. **D. reflexa** Hook. f. in Hook. Niger Fl. p. 306 (1849); Welw. Apont. p. 584, n. 9 (1859); Baker in Oliv. Fl. Trop. Afr. ii. p. 189.

Golungo Alto.—A widely and rather high climbing undershrub, hanging down for a long distance; stem twining; petioles and leaves patently pilose; flowers deep violet-purple, handsome. On tall shrubs, in Sobato Cabanga Cacalungo; fl. and fr. March 1856, at an elevation of 2400 ft. No. **2232**. A much-branched scandent shrub; seeds 2 or 3, biconvex, two-thirds surrounded by the long linear umbilicus. Cabanga Cacabunga, Feb. 1856. Near Trombeta, Sept. 1857. Coll. Carp. 411.

39. **CANAVALI** Adans. Fam. Pl. ii. p. 325 (1763); *Canavalia* DC. (1825), Benth. & Hook. f. Gen. Pl. i. p. 537.

1. **C. maritima** P. Thouars in Desv. Journ. Bot. i. p. 80 (1813). *Canavalia obtusifolia* DC. Prodr. ii. p. 404 (1825); Baker in Oliv. Fl. Trop. Afr. ii. p. 190. *Canavalia Moneta* Welw. Apont. p. 588, n. 62.

Ambriz.—In maritime sandy stations at the mouth of the river Loge on the left bank, near the bridge at Ambriz; only one plant, fr. without fl. Nov. 1853. No. **2192** (partly). Coll. Carp. 412.

Barra do Dande.—Seeds when quite ripe red-brown, oblong- or obovoid-globose, very hard. Praia de S. Thiago; fr. Sept. 1858. No. **2192** (partly). An annual plant, procumbent to a great distance. Praia de S. Thiago; fr. Sept. Coll. Carp. 416. Leaflets obovate-rotund; flowers purple; seeds 5 or 6 (Welw. Apont., *l.c.*).

Loanda.—A creeping herb, ascending, coriaceous-fleshy throughout even to the flowers; stem puberulous with white sub-appressed hairs; leaflets rigidly coriaceous, elliptic-orbicular, scarcely shining, wrinkled-veiny above, densely raised-veiny between the lateral veins below; corolla bright-purple, coriaceous; petioles and petiolules deeply channelled; pods linear-oblong, 5-8-seeded. Rather rare, but several specimens near together, in maritime sandy places, near Conceiçaõ, after the fall of the flower, in June 1858. No. **2191**. Penedo; fr. August 1858. Coll. Carp. 415. Suffruticose, scandent, or prostrate, with very long runners; seeds used as small change. Boa Vista Sept. 1854. Coll. Carp. 533.

2. **C. incurva** P. Thouars in Desv. Journ. Bot. Appl. i. p. 80 (1813). *Canavalia ensiformis* DC. Prodr. ii. p. 404 (1825); Baker, *l.c.*, p. 190.

Loanda.—A high-climbing herb; flowers whitish-rose-coloured; pods 12 to 13 in. long; seeds red. Cultivated and occasionally subspontaneous, and amidst neglected crops in gardens, about the city of Loanda; fl. and fr. March to June 1858. No. **2193**. A high and widely climbing undershrub, annual; leaflets sub-coriaceous; flowers rose-coloured; pods a foot long; seeds white. In neglected plots of previous cultivation near Bemposta; fl. and fr. May 1859. No. **2194**. Fr. cultivated in gardens in the city of Loanda, August 1858. Coll. Carp. 951.

Golungo Alto.—A large herb, somewhat shrubby at the base; stems very tenacious, hard, green, climbing far and wide; rachis of the flowering racemes very hard, rigid, coarsely nodose; flowers violet-purple; calyx green. Not at all common, in rather open woods by thickets along the right bank of the rivulet Quibôlo; fl. and young fr. 19 March 1856 and May 1855. No. **2195**. Ripe fr. June 1855. Coll. Carp. 414. Large red bean; Sept. 1855. Coll. Carp. 413.

Cazengo.—In mountainous places near Palmira ; fl. 25 Dec. 1854. No. **2195***b*.

Pungo Andongo.—Flowers nearly whitish throughout ; in bushy places near Caghuy; fl. April 1857, at an elevation of 3800 ft. No. **2196**.

40. **PHASEOLUS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 538.

The following Nos. from the carpological collection apparently belong to this or some allied genera; they consist of seeds only, and it is difficult or impossible to assign the species in each case :—

Golungo Alto.—Bango road. Called "Bûri." Coll. Carp. 425. Ten kinds such as are cultivated in this district, 1857. Coll. Carp. 456.

Pungo Andongo.—Condo on the Cuanza, March 1857. Several species or varieties such as are cultivated in Bihé and Bailundu. Coll. Carp. 419.

1. **P. lunatus** L. Sp. Pl. edit. 1, p. 724 (1753) ; Welw. Apont. p. 573 (1859) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 192.

Golungo Alto.—A widely climbing herb ; standard herbaceous-green ; wings whitish ; keel whitish-green ; pods 2-3-seeded ; in deserted fields near Cambondo, sometimes cultivated by the negroes ; fl. and young fr. July 1855, at an elevation of 2400 ft. No. **2203**. Cf. Coll. Carp. 420, 421.

2. **P. adenanthus** G. F. W. Mey. Prim. Fl. Esseq. p. 239 (1818) ; Baker, *l.c.*, p. 192.

Pungo Andongo.—Cultivated near the fortress of Pungo Andongo, and occasionally spontaneous ; fr. not quite ripe March 1857. No. **2197**.

3. **P. vulgaris** L. Sp. Pl. edit. 1, p. 723 (1753) ; Baker, *l.c.*, p. 193.

Loanda.—Flowers whitish-yellow. Commonly cultivated throughout the district and occasionally subspontaneous along neglected fields ; in cultivated fields near Maiango do Povo ; fl. and young fr. Dec. 1858. No. **2198**.

Golungo Alto.—A twining annual herb ; flowers whitish-yellow and variegated with violet, somewhat turning yellow, at other times altogether whitish or wholly violet ; seeds of a uniform colour, or variegated, striated, etc.; it ripens fruit two or three times in each year in one and the same place. Varzea de Isidro, and near Undelle, Camilungo ; frequently cultivated throughout the district ; Oct. and Dec. 1855, and June 1856 ; at an elevation of 2400 ft. No. **2199**.

The following No. looks more like a variety of *Phaseolus vulgaris* L., than anything else (Baker ms. in study set) :—

Golungo Alto.—A widely climbing herb ; leaves large ; leaflets 5 to 7½ in. long, about equalling the common petiole ; flowers yellowish-violet ; by thickets of primitive forests, between Sange and Sobato Mussengue, very rarely met with ; fl. April 1856. No. **2205**.

The following Nos. from the carpological collection apparently belong here :—

Golungo Alto.—Varzea de Bango, June 1856 ; seeds yellow-greenish such as very rarely occur. Coll. Carp. 418. Varieties of the common kidney-bean gathered in the field below Isidro's house. Coll. Carp. 424.

41. **VIGNA** Savi; Benth. & Hook. f. Gen. Pl. i. p. 539.

1. **V. procera** Welw. ms. in Herb., sp. n.

A handsome robust erect closely hairy herb, growing in dampish situations to the height of 3 to 5 ft., with several stems, leafy from the base to the apex, of a pretty green hue; branchlets compressed-angular, furrowed, rather erect than patent; hairs glistening; leaves trifoliolate, the upper ones 3 to 6 in. long; stipules obliquely ovate, subacute or acuminate, from a broad sessile base, erect, not peltate, persistent, $\frac{1}{4}$ to $\frac{3}{8}$ in. long, hairy outside, glabrous or nearly so inside; common petiole $\frac{1}{8}$ to $\frac{1}{6}$ in. long, hairy, stout; leaflets oval-oblong, not lobed, obtuse at both ends, apiculate, glandular-hairy on both sides, firmly chartaceous, the terminal one $2\frac{1}{2}$ to 5 by $1\frac{1}{4}$ to 2 in. on a petiolule of $\frac{1}{2}$ to 1 in., lateral leaflets $1\frac{1}{2}$ to $3\frac{1}{4}$ by $\frac{3}{4}$ to $1\frac{1}{4}$ in. on petiolules of $\frac{1}{12}$ to $\frac{1}{8}$ in.; stipels small, ovate, partly glabrous, deciduous; flowers about an inch long, yellow, turning purple in the dry state, clustered a few or several together at and near the extremity of lateral hairy peduncles of 2 to 9 in. in length; bracteoles lanceolate, acute, $\frac{1}{4}$ in. long; calyx $\frac{2}{3}$ in. long, hairy outside, glabrous or nearly so inside, campanulate, deeply 5-cleft, on a very short pedicel; lobes lanceolate-prolonged, acute, the two upper ones connate a little higher and rather larger than the rest; the lowest lobe a little shorter than the rest; standard orbicular, obcordate, folded together above the claw, with inflexed auricles; stamens diadelphous, the vexillary stamen free from the first; filaments of the other stamens connate two-thirds way up; anthers uniform, obtuse; ovary compressed, linear, hairy, nearly $\frac{1}{2}$ in. long; ovules about 6; style glabrous below, penicillate at the apex, bearded below the oblique stigma; disk surrounding the base of the ovary cupuliform, 10-dentate; pods $1\frac{1}{2}$ to 2 in. long, $\frac{1}{6}$ to $\frac{1}{4}$ in. broad, somewhat compressed, not winged, more or less septate internally; seeds 3 to 6, reniform, $\frac{1}{5}$ in. long, rather compressed, of a coffee-brown colour (in the dry state).

Huilla.—In grassy places, at the banks of the great lake of Ivantâla, at an elevation of about 4500 ft., sporadic; with a few fl. and in fr. end of Feb. 1860. No. **2274**.

A distinct species, coming amongst African species nearest to *Vigna Burchellii* Harv.

2. **V. andongensis** Baker in Oliv. Fl. Trop. Afr. ii. p. 197.

Pungo Andongo.—On the grassy slopes of Serra de Pedras de Guinga; (in leaf January;) in leaf and fl. March 1857. No. **2268**.

3. **V. radicans** Welw. ex Baker, *l.c.*, p. 198.

Huilla.—Rootstock perennial, fusiform; stems whip-like, several, prostrate, rooting at the nodes; leaflets obtuse, apiculate; calyx-teeth elongated, very narrow, rufous-feathery; corolla deep-violet. Remarkably social, resembling clover in European meadows; in dampish pastures, near Humpata; fl. and young fr. April 1860; at an elevation of 4000 to 4500 ft. No. **2254**.

4. **V. reticulata** Hook. f. in Hook. Niger Fl. p. 310 (1849); Baker, *l.c.*, p. 198.

Golungo Alto.—A widely climbing herb, in habit of foliage resembling a species of *Lygodium*; flowers reddish. In the wooded thickets of Mato de Quisuculo; fl. and young fr. April 1855; at an elevation of 2400 ft. No. **2251**.

Pungo Andongo.—Leaflets rather rigid; flowers violet-purple. In grassy woods near Mopopo, at an elevation of 3800 ft.; fl. 30 April 1857. No. **2252**.

5. **V. golungensis** Baker in Oliv. Fl. Trop. Afr. ii. p. 199.

Golungo Alto.—A scandent or prostrate herb, with yellow flowers. In wooded places on a sandy schist, near Mussengue; fl. without fr. April 1856. No. **2271**.

6. **V. capensis** Walp. in Linnæa xiii. p. 533 (1839).

V. vexillata Benth. in Mart. Fl. Bras. xv. I. p. 193, t. 50 f. 1 (1859); Baker, *l.c.*, ii. p. 199.

Golungo Alto.—A twining herb, remarkable for the hairiness of all parts except the corolla and also for the elongated teeth of the calyx; standard of a dirty-violet colour longitudinally overrun with rather raised dark-purple veins; wing-petals blue-violet; keel pale-violet, almost whitish. Not common, in grassy places, at the borders of the primitive forest of Sobato de Mussengue; fl. and young fr. 24 May 1856. No. **2253**. A twining herb, climbing far but not high; flowers violet-coloured; rather rare, at the skirts of the reed-beds and thickets of Sobato de Bumba, near the house of Luis Pereira; fr. 17 Feb. 1856. No. **2275**. Flowers violet-purple; by the road at the skirts of the primitive forests of Sobato de Mussengue; fl. and young fr. May, in ripe fr. June 1856. No. **2276**.

Mossamedes.—Flowers large, violet-coloured; standard much curved inwards. In fields planted with *Saccharum officinarum* L., near Boã Vista; one specimen; fl. and fr. July 1859. A form with leaflets $1\frac{1}{2}$ to $2\frac{1}{4}$ by $\frac{5}{8}$ to $1\frac{3}{8}$ in., all rounded at the base. No. **2270**.

Var.? **albiflora** (Welw. ms.).

Flowers white.

Mossamedes.—At the banks of the river Bero (Rio das Mortes) near the town; fl. June 1859, fr. June 1860. Coll. Carp. 426.

7. **V. phaseoloides** Baker in Oliv. Fl. Trop. Afr. ii. p. 200.

Pungo Andongo.—Flowers about 1 in. long, violet-purple; calyx $\frac{1}{2}$ in. long; pods narrowly linear, subulate-apiculate. In bushy pastures by the river Cuanza at the borders of forests, in company with two species of *Protea*, between Sobato Bumba and the Condo cataract; fl. and fr. in the rainy season, March 1857. No. **2269**.

8. **V. platyloba** Welw. ms. in Herb., sp. n.

A decumbent herb, at length twining-scandent, often 3 to 6 ft. long; rootstock thick, perennial; stems ascending at the base and not rarely erect to the height of 2 to 3 ft.; branches straggling, remote, elongated, at length climbing, curved, more or less angular, thickly beset with short downward hairs from a small bulbous or glandular base; leaves pinnately trifoliate; common petiole hairy like the branches, firm, $\frac{3}{4}$ to $2\frac{1}{4}$ in. long; stipules lanceolate, $\frac{1}{4}$ to $\frac{3}{8}$ in. long, hairy outside with upward hairs; stipels ovate, obtuse, nearly glabrous but with small sessile glands, small; central leaflet irregularly rhomboid or oval in general outline, very obtuse,

mucronate, more or less trifid, 2 to $2\frac{1}{2}$ in. long, $1\frac{1}{4}$ to 2 in. wide, with obtuse lobes and on a petiolule of $\frac{3}{8}$ to $\frac{3}{4}$ in. bearing the stipels shortly below the apex; lateral leaflets $1\frac{1}{2}$ to $2\frac{1}{4}$ in. long, 1 to $1\frac{1}{2}$ in. wide, similar but lop-sided, the outer lobe being only or chiefly developed; all the leaflets spread with appressed hairs and scattered with small sessile shining glands, firmly chartaceous; flowers rose-purplish, $\frac{3}{4}$ in. long, clustered a few together, sessile or subsessile, near the extremities of axillary pedunculoid branches of 1 to 6 in. in length; calyx $\frac{1}{3}$ in. long, campanulate, appressedly hairy outside, shortly lobed; upper lip or lobe deltoid, bidentate, lower lobes 3, ovate-deltoid; stamens diadelphous; vexillary stamen free from the base; the other with filaments free for $\frac{2}{5}$ of their length; anthers uniform, obtuse; ovary compressed, oval-linear, ciliate on the edges, glabrous or nearly so on the faces; style flattened, glabrous below, bearded above; stigma oblique; young pod appressedly hairy, sub-linear, compressed.

Pungo Andongo.—In the somewhat sandy thickets of the more open forests, between Caghuy and Sansamanda; fl. and young fr., also without fl., in April and May 1857. No. **2278**.

This species is nearly related to *Vigna hastifolia* Baker.

9. **V. holosericea** Welw. ex Baker, *l.c.*, p. 200.

Golungo Alto.—Whitish-silky in all parts; flowers very large, $1\frac{3}{4}$ in. long, rose-purple; in bushy places, at the banks of the river Muia, Sobato Cabanga Cacalungo; fl. and young fr. beginning of June 1856. No. **2258**.

Cazengo.—By thickets, between Cambondo and Luinha, rather rare; flowers about $1\frac{1}{2}$ in. long; pods (young) 5 to 6 in. long; June 1855. No. **2258***b*.

10. **V. parviflora** Welw. ex Baker, *l.c.*, p. 201.

Mossamedes.—Flowers greenish-purple, $\frac{1}{4}$ to $\frac{1}{3}$ in. long, the smallest of any species of this genus in the collection. Rather rare, in sandy reed-beds, at the banks of the river Bero; a unique specimen; fl. and young fr. August 1859. No. **2266**.

11. **V. ambacensis** Welw. ex Baker, *l.c.*, p. 201.

Ambaca.—A rather rigid herb, climbing in a twining manner; mode of growth of the flowering shoots remarkable; rachis with dense and thick nodes; flowers violet-purple, rather small, $\frac{1}{2}$ in. long, numerous; standard pubescent. In damp thickets and reed-beds, at the left bank of the river Caringa; fl. and young fr. June 1855, at an elevation of about 2800 ft. No. **2260**.

12. **V. comosa** Baker in Oliv. Fl. Trop. Afr. ii. p. 202.

Pungo Andongo.—Flowers yellow or turning yellow. In bushy places with tall grass, near Condo, above the cataract; fl. March 1857. No. **2257**.

13. **V. ornata** Welw. ex Baker, *l.c.*, p. 203.

Golungo Alto.—A much-branched rigid undershrub, climbing widely, woody to a considerable height, copiously flowering, 4 to 6 ft. high; leaves chartaceous-rigid, pale-green, shining; flowers large, much-crowded, handsome, conspicuous from a long distance, purple-violet and variegated with blue. Calyx shortly campanulate; limb

4-cleft ; 3 lobes broad, obtuse, the lowest ovate ; the top lobe more or less deeply emarginate ; standard broad, obliquely reflexed, at the base with a lanceolate callus and downward gibbous appendages ; petals of the not twisted keel a little unequal ; beak obtuse, bent inwards ; standard and wing-petals violet-purple ; keel whitish-yellowish ; vexillary stamen free, its filament kneed at the base, with a short obtuse appendage ; style compressed, deeply channelled on both sides, above spathulate-dilated, puberulous ; stigma crest-shaped, hispidulous. By thickets along the banks of the river Quiapoze near Sange, a remarkable ornament of the place ; fl. and young fr. April, May, and June 1856. No. **2259**.

14. **V. triloba** Walp. in Linnæa, xiii. p. 534 (1839) ; Baker, *l.c.*, p. 204.

Loanda.—A herb persisting for several years but scarcely perennial ; stems branched, sarmentose, climbing widely ; leaves very polymorphous ; flowers rose-violet ; fruiting peduncles much elongated. Frequent in sandy thickets composed of *Euphorbia*, Alto das Cruzes ; fl. and fr. 13 Feb. 1858. Morro da Cruz, April 1854. No. **2262**.

Golungo Alto.—A herb of 4 to 8 ft., climbing far and high ; branches at times 3 to 4 ft. long ; flowers green-purplish ; standard violet, quickly marcescent, greenish-violet on the external surface, spotted with yellow at the base inside ; wing-petals beautifully blue or of a deep red-violet colour ; keel white or slightly violet. A form with leaflets broader, shorter and more compact than usual. Common and polymorphic, in reedy thickets and in grassy places with tall herbage, around Sange, Undelle, and by the Ambaca road ; Sept. 1855, April, May and July 1856. No. **2277**.

Pungo Andongo.—A herb enduring apparently for several years ; stem climbing, divaricately branched, angular ; flowers yellowish in the bud, when expanded with a pale rose-whitish keel, and standard and wing-petals pale-purple. In grassy thickets between Candumba and Lombe ; fl. March 1857. Seen previously in Dec. 1856 near Condo within the fortifications. No. **2263**.

The following No., destitute of leaves, appears to belong to this species ; the stipules accord :—

Ambriz.—On sandy hills near the city of Ambriz ; fr. Nov. 1853. No. **2261**.

15. **V. huillensis** Welw. ex Baker, *l.c.*, p. 204.

Huilla.—A perennial twining herb, glabrous throughout ; stem with several furrows ; stipules peltate, rigid, nerved ; leaves trifoliolate ; stipels suboval-spathulate ; odd leaflet truncate-cuneate at the base ; calyx-teeth rather shorter than the papillose-rugose tube, broadly deltoid ; bracteoles orbicular-elliptic or broadly obovate ; flowers about 1 in. long and broad, bright rose-violet ; standard marked at the base with two yellow spots. In bushy pastures between Humpata and Lopollo ; fl. and young fr. Dec. 1859 ; at an elevation of from 4000 to 5000 ft. No. **2264**.

16. **V. Catjang** Walp. in Linnæa xiii. p. 533 (1839).

V. unguiculata Walp. Rep. i. p. 779 (1842) ; Welw. Apont. p. 573 (1859). *V. sinensis* Endl. ex Hassk. Pl. Jav. Rar. p. 386 (1848) ; Baker, *l.c.*, p. 204 ; Ficalho, Pl. Uteis, p. 142 (1884).

Loanda.—An annual climbing herb ; corolla open only for a few hours, soon closed being covered by the standard ; standard of a

whitish pale-sulphur colour; wing-petals violet-purple; keel whitish. Very rarely spontaneous, at the edges of fields; very frequently cultivated throughout the district. Near Alto das Cruzes and in the island of Cazanga Maringa do Povo; fl. end of Feb. 1858. No. **2272**.

Libongo.—Frequently cultivated and subspontaneous, at the banks of the river Lifune, in moist fields; fl. and young fr. Sept. 1858. No. **2272***b*.

Golungo Alto.—An annual herb, sometimes prostrate on the ground, at other times twining and climbing; flowers yellowish or the standard yellow-violet, wing-petals violet; keel whitish-yellowish; seeds dark-purple. In fields throughout the district, and more or less cultivated in nearly all mountainous parts; occasionally spontaneous; fl. and fr. at Sange in May 1856. Native name "Macundi" (plural), "Licundi" (singular). No. **2273**. Sange, frequently cultivated, and also spontaneous; seeds July 1856. Coll. Carp. 422. Two crops in a year, in April and Dec.; frequently cultivated from Sange to Trombeta. Coll. Carp. 423.

17. **V. glabra** Savi, Obs. Gen. Phaseol., Mem. iii. p. 8 (1825). *V. luteola* Benth. in Mart. Fl. Bras. xv. I. p. 194, t. 50, f. 2 (1859); Baker, *l.c.*, p. 205.

Huilla.—A slender, widely climbing herb, with yellow-violet-variegated flowers; in damp meadows near Catumba; fl. and young fr. April 1860. No. **2267**. Along wooded thickets near the great lake of Ivantâla, sporadic; fl. and young fr. Feb. 1860. No. **2267***b*.

Var. *β*. **villosa**. *V. villosa* Savi, *l.c.*, p. 9. *V. luteola*, var. *β*, Baker, *l.c.*, p. 206.

Golungo Alto.—Twining, puberulous or hispidulous; flowers yellow, standard orange-red, pubescent; in damp palm-groves, Mussengue, between Sange and Bango, by the road, along streams; fl. and ripe fr. 1 May 1856. No. **2255**. A twining herb, climbing high; racemes very acute; flowers violet-purple, mostly set two together in the axil of a papilliform body; in the wooded thickets of stream Quibolo, rather rare, Arimo do Mariano; fl. and young fr. April 1856. No. **2256**. A hispid rather rigid climbing herb; flowers soon after opening beautifully blue before midday, but after some hours' exposure to the sun becoming red or violet; in the wooded thickets of the primitive forest of Quisuculo; fl. April 1856. No. **2256***b*.

The following No. is of quite uncertain species, but must be compared with this; it is represented in the British Museum set by a drawing and a detached flower:—

Ambaca.—A perennial herb, at the time of collection in flower but entirely destitute of foliage, about 3 in. high; flowering stem somewhat hairy with downward hairs; flowers rose-violet. In the rather dry pastures near N-gombe; Oct. 1856. No. **2265**.

42. **VOANDZEIA** P. Thouars; Benth. & Hook. f. Gen. Pl. i. p. 207.

1. **V. subterranea** P. Thouars ex DC. Prodr. ii. p. 474 (1825). Welw. Apont. p. 573; Baker, *l.c.*, p. 207; Ficalho, Pl. Uteis, p. 142 (1884).

Golungo Alto.—Cultivated, rather rare; seeds in Oct. 1854. Coll. Carp. 427.

Pungo Andongo.—Flowers smaller than described in Fl. Trop. Afr., *l.c.* Rather rarely cultivated about Caghuy and Bumba; not

seen wild; fl. Feb. 1857. No. **2206**. Condo, Bailunda. Native name "Viólo." Fr. March 1857. COLL. CARP. 428. The Bambarra nut. Fr. May 1857. COLL. CARP. 429.

BENGUELLA.—Near the town. Fr. COLL. CARP. 430.

43. **CACARA** P. Thouars in Dict. Sc. Nat. vi. p. 35 (1806). *Pachyrhizus* Rich. (1825); Benth. & Hook. f. Gen. Pl. i. p. 540.

1. **C. (?) orbicularis.**

Pachyrhizus? orbicularis Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 208.

PUNGO ANDONGO.—A herb, woody at the base; stem cylindrical, softly tomentose, twining, climbing rather high; leaves trifoliolate, stipellate; stipules ovate-lanceolate, acuminate, reflexed; racemes spicate, slender, long-peduncled; bracts widely ovate, acuminate; flowers very shortly pedicelled, whitish-yellow; calyx campanulate; upper lip shortly bifid; lower lip trifid, the middle broader a little longer and shortly acuminate; petals all clawed; standard obcordate-orbicular, auricled at the base on both sides; wing petals each with a long lobe or tooth on one side of the base; keel very obtuse; stamens monadelphous; anthers uniform; ovary sessile, linear-compressed, nearly straight, clothed with long pilose white hairs, about 8-ovuled; style glabrous, curved or bent, scarcely tapering upwards; stigma small, capitate, oblique, presented towards the standard. Sporadic, in exposed thickets, climbing on taller plants, at the base of Serra de Pedras de Guinga; very sparingly fl. Jan. 1857, at an elevation of 3800 ft. No. **2184**.

In the absence of the fruit the genus must remain doubtful.

44. **BOTOR** Adans. Fam. Pl. ii. p. 326 (1763). *Psophocarpus* Neck. (1790); Benth. & Hook. f. Gen. Pl. i. p. 540.

1. **B. palustris** O. Kuntze, Rev. Gen. Pl. i. p. 163 (1891).

Psophocarpus palustris, Desv. in Ann. Sc. Nat. Ser. i. vol. ix. p. 420 (1826); Baker in Hook. f. Fl. Brit. Ind. ii. p. 212 (1876). *P. longepedunculatus* Hassk. Pl. Jav. Rar. p. 388 (1848); Baker in Oliv. Fl. Trop. Afr. ii. p. 208; Ficalho, Pl. Uteis, p. 142 (1884). *P. Mabâla* Welw. Apont. p. 589, n. 69.

AMBRIZ.—A widely climbing herb; leaflets rather fleshy; flowers bluish; pods broadly 4-winged, 1½ to 2 in. long, black when ripe, spirally twisted after dehiscence; seeds several. Frequent, near the lake called Lagôa da Quibanza de Ambriz, at a distance of 2 leagues from the ocean; in young fr. and climbing on a Composite (*Conyza?*) as in the British Museum specimen, Nov. 1857. No. **2279***b*. Twining; pods broadly 4-winged; Lagôa de Quibança; fr. Nov. 1853. COLL. CARP. 532.

LOANDA.—In moist situations with dense herbage, throughout the district but sporadic; near Quicuxe, etc.; fl. Dec. 1853; fr. Jan. 1854. No. **2279**.

LIBONGO.—A herb, apparently persisting for several years; stem slender, tenacious, very widely climbing; flowers pale-blue; pods 4-winged; seeds edible, sedulously collected, and cooked in palm-oil by the negroes like those of other species of the Phaseoleæ. Very abundant in marshy bushy places throughout this district, but at some distance from the coast; fl. and fr. Sept. 1858. Native name "Mabâla." No. **2279***c*. Leaves trifoliolate; pods broadly winged, 2-6-seeded; seeds

eaten by the negroes in the same manner as those of Macundi. In thickets near the river Lifune ; fl. and fr. Sept. 1858. Coll. Carp. 432.

Golungo Alto.—A herb with its stem suffruticose at the base, twining or climbing far and widely ; leaves and habit of a *Stizolobium*, but the stem leaves and pods entirely free from stinging hairs ; leaflets of the younger specimens not rarely marked with broad yellowish-green spots ; flowers bright-violet, hardly smaller than those of *Pisum sativum* L., but much contracted in drying ; anthers ovate-oblong, abruptly acuminate, 2-celled ; membranes of the cells thick, swelled ; pods like those of a *Tetragonolobus* (a section of the genus *Lotus*), straight, 1½ in. long, rather thick and compressed, turning quite black when ripe, dehiscent, 2-winged on each suture (therefore the whole pod 4-winged) ; wings broad, membranous ; seeds several, as big as small peas, intercepted by partial dissepiments. Abundant and almost everywhere by damp thickets and neglected palm-groves, especially near the river Quibôlo ; fl. and scarcely ripe fr. April 1856. Road by Bango, June 1856. No. **2280**. In thickets near Candombo. Coll. Carp. 431.

45. **DOLICHOS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 209.

1. **D. Lablab** L. Sp. Pl. edit. 1, p. 725 (1753) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 210 ; Ficalho, Pl. Uteis, p. 143 (1884).

Lablab cultratus Welw. Apont. p. 590, n. 85.

Loanda.—A perennial herb or at least lasting for three years ; root-stock woody, many-headed ; stems numerous, sarmentose, scandent, constituting very dense extensive low thickets, scarcely 3 ft. high ; flowers sometimes purple, sometimes sulphur-yellow or variegated ; seeds black, eaten by the negroes. By stagnant pools, at the banks of streams, and in moist bushy fields, about Quicuxe, Imbondeiro dos Lobos, Represa de Manuel Perevia, etc. ; certainly indigenous ; fl. Dec. 1853, in fr. Feb. and April 1854 ; fl. and young fr. 7 July 1854. No. **2200**.

Barra do Bengo.—A prostrate much-branched far-procumbent herb, annual and also persisting for several years, or at least biennial ; runners far-creeping or somewhat twining ; stems greenish, as also the petioles and peduncles ; standard reflexed from the claw, folded back on the sides, violet-purple ; wing-petals appressed to the keel, violet-purple ; keel falcate upwards through a right angle, closely including the essential organs, whitish ; style patently bearded on the side facing the standard ; stigma waxy-fleshy, capitate-obtuse ; pod 1⅓ to 1½ in. long, ½ in. broad, finely transversely wrinkled, whitish-brown, scimitar-shaped, typically 5-seeded, evidently muriculate on the upper suture, obsoletely so on the lower suture, somewhat hooked at the apex ; seeds oblong-elliptical, but little compressed, dark brown and indistinctly black-spotted. Not uncommon, in moist thickets from Quicuxe towards Cacuaco ; fl. and fr. end of July 1858. No. **2201**. Coll. Carp. 433.

Golungo Alto.—A herb, sometimes prostrate with the flowering shoots somewhat ascending, at other times widely climbing and twining ; flowers bright, purple-violet ; calyx 4-lobed ; the upper lobe broad, the 3 other lobes linear-lanceolate, very acuminate ; style compressed, bearded beneath below the truncate stigma ; pod densely tomentose, at length when fully ripe whitish-woolly. In bushy places at the borders of forests between Sange and Sobato Bango Aquitambe ; fl. and fr. 1 May 1856. No. **2204**. A much elongated herb, very widely climbing upon the ground and on neighbouring shrubs ; flowers violet-painted. In palm groves by the river Quiapoze ; July 1855 ; fl. and fr. No. **2204***b*.

PUNGO ANDONGO.—A poor specimen in fl. and young fr. No notes. No. **4128**.

MOSSAMEDES.—A tall herb, widely climbing; leaves rather rigid, deep-green; flowers yellow, rather large; seeds eaten by the negroes. In reedy places and amidst shrubs in damp places about the mouth of the river Giraûl; fl. and fr. 18 July 1859. No. **2202**. COLL. CARP. 434.

2. **D. biflorus** L. Sp. Pl. edit. 1, p. 727 (1753); Baker, *l.c.*, p. 210.

LOANDA.—Weak; flowers solitary, of a deep-sulphur colour; pods membranous- or cellulose-septate inside, afterwards 1-celled. On rather dry elevated hills near Mutullo above Quicuxe, rare, climbing on low plants of *Euphorbia*; in sparse fl. and in ripe fr. May 1854. No. **2212**.

GOLUNGO ALTO.—An annual herb; stems rooting at the base, soon twining; flowers yellow. On dry sparingly grassy hills of Serra de Queta Occidental (Moangue), at an elevation of 2400 ft.; fl. and young fr. March 1856. No. **2210**.

PUNGO ANDONGO.—A shaggy herb; stem procumbent-twining, extremities scandent; flowers whitish-yellow. Sparingly, in rather sandy dampish pastures, between Lombe and Quibinda (or Cabinda), at an elevation of 3800 ft.; fl. and young fr. March 1857. A variety, according to Baker, *l.c.*, p. 211. No. **2209**.

3. **D. axillaris** E. Mey. Comment. Pl. Afr. Austr. Dreg. p. 144 (*Dolichus*) (1836); Baker, *l.c.*, p. 211.

GOLUNGO ALTO.—A slender twining herb; leaflets deep-green, membranous; flowers green; petals all herbaceous-green at first, at length gradually somewhat sulphur-yellow. In plantations of *Manihot utilissima* Pohl, at the base of the mountains of Serra de Alto Queta, near Undelle; fl. and young fr. end of April 1856. No. **2211**.

HUILLA.—A herb, prostrate at the base; stems at length twining, climbing on low shrubs; flowers pale-yellow. In shortly bushy rather dry pastures between Eme and the great lake of Ivantâla, rather sparingly; fl. and young fr. end of Feb. 1860. No. **2208**.

4. **D. rupestris** Welw. ex Baker, *l.c.*, p. 212.

HUILLA.—Root woody, many-headed, penetrating the stony soil or clefts of the rocks with its firm elongated fibres; stems prostrate, somewhat flexuous, extending; leaves and yellow flowers secund downwards; pods long and gradually acuminate. In stony places and in the clefts of rocks, along the borders of forests, near Mumpulla, at an elevation of 4000 ft.; fl. and young fr. Oct. 1859. No. **2219**.

5. **D. stipulosus** Welw. ex Baker, *l.c.*, p. 212.

HUILLA.—A perennial herb; root somewhat woody; fibres stout tubercle-shaped, nearly filipendular; stems erect or ascending, 4 to 6 in. long, sparingly branched, flexuous, shortly tomentose; leaves trifoliolate; leaflets obovate-lanceolate; stipules ovate-lanceolate, broad, persistent, as well as the stipels nerved-striate or rather lined-sulcate; flowers yellow yellowish or whitish; style gradually subulate, thinly pubescent; stigma capitate. Sparingly, in the elevated shortly bushy pastures of Empalanca, on the highest parts of Morro de Lopollo, at an elevation of 5000 ft.; fl. and very young fr. Nov. 1859. No. **2220**.

The following No. seems to be a taller form of this species; it is a unique specimen:—

PUNGO ANDONGO.—An erect herb, 15 in. high; lower leaves simple, upper leaves trifoliolate; stipules the length of the petiole; leaflets

lanceolate; flowers whitish. In sandy woods near Cazella, within the fortified lines of Pungo Andongo; fl. 18 Oct. 1856. No. **2221.**

Mr. Baker, *l.c.*, refers in a note to another plant, which he states may possibly come in here; the next following No. appears to be the plant referred to:—

Huilla.—An erect rigid herb, with the habit of *Cajanus*, 1 to 1½ ft. high; root perennial, tuberous; stems more or less pubescent, leafy above; leaves pinnately trifoliolate, shortly pubescent; stipules lanceolate, ¼ to ⅓ in. long, pubescent outside, glabrous within; petiole ⅓ to ½ in. long; stipels lanceolate, $\frac{1}{10}$ to ⅛ in. long, about equalling the lateral petiolules, central petiolule $\frac{1}{10}$ to ⅕ in. long; leaflets lanceolate, usually apiculate, three-ribbed, 2 to 3¼ in. long, ⅓ to ½ in. broad, the central one rather larger than the lateral ones; peduncles axillary, 2 or 3 together, each 1-flowered, ⅓ to ½ in. long, pubescent; bracts filiform; calyx ½ in. long, pubescent, cleft below the middle, the upper lobes connate nearly to the apex; lobes acute, narrow upwards; pod 1½ in. long, ⅓ in. broad, shortly pubescent, 4-6-seeded; seeds ⅙ in. long, obovoid. In rather dry bushy pastures between Lopollo and Jâu; one plant; fr. April 1860. No. **4126.**

6. **D. andongensis** Welw. ex Baker, *l.c.*, p. 213.

Pungo Andongo.—A quite glabrous bright green climbing herb; stem slender; flowers violet and purple, variegated; pods much compressed, falcate, gradually broader towards the apex; septa thin, membranous, sub-fugaceous. Sparingly, in damp forests, near Candumba, in company with *Oxytenanthera abyssinica* Munro (Welw. Herb. No. 1134); fl. and ripe fr. end of March 1857. No. **2207.**

7. **D. densiflorus** Welw. ex Baker, *l.c.*, p. 214.

Huilla.—A herb; root thick, woody, many-headed, sub-tuberous; stems several, 1 to 3 ft. high, erect or ascending, mostly sparingly branched from the base; leaves trifoliolate; leaflets coriaceous; stipules costate-striate on the inner surface; flowers deep-yellow, condensed in short axillary many-flowered racemes; bracts and bracteoles obtuse; calyx two-thirds cleft in a bilabiate manner; vexillary stamen at length quite free, deciduous with the standard; style gradually subulate. In woods along streams, between Monino and the great lake of Ivantâla; fl. and young fr. Dec. 1859. No. **2218.**

8. **D? Dongaluta** Welw. ex Baker, *l.c.*, p. 214; Ficalho, Pl. Uteis, p. 143 (1884).

Golungo Alto.—A perennial herb; root thickly tuberous, with cracked bark fleshy fibres and exuding purple resin; stems 1 to 2 ft. long, several from the same root, erect, angular, glabrous, not seen in full development; leaves trifoliolate, stipellate; leaflets inconspicuously hispidulous beneath along the raised nerves, otherwise quite glabrous; flowers violet-purple, arranged on axillary peduncles in a fasciculate manner, racemose; peduncles much shorter than the leaves, but appearing before the full development of the leaves; bracts rather broadly ovate, with several nerves; bracteoles at the base of the calyx or on the middle of the pedicels, very narrow, subulate, caducous; calyx thinly membranous, purple-punctate inside, shortly campanulate; teeth deltoid, abruptly subulate at the apex, the two upper ones connate high up; standard orbicular, with two auricles above the claw and again below the lamina; auricles oblong, obtuse, directed upwards; wing-petals narrowly obovate, equalling the keel and slightly adhering to it; keel curved inwards, not beaked, rather obtuse; vexillary stamen

free, kneed at the base, glandular-appendaged at the knee ; anthers uniform ; ovary 3-4-ovuled, scarcely stipitate, girt at the base with a high tender truncate sheath ; style glabrous, compressed-dilated above the ovary ; stigma terminal, capitate, penicillate. In neglected fields, along the borders of forests, between Sange and Undelle, amidst deserted plantations of *Manihot utilissima* Pohl., rare ; fl. Feb., in full foliage in May 1856 ; fr. not seen. Native name "Dongaluta." No. **2225**.

PUNGO ANDONGO.—Probably a form of the same species with narrower leaflets ; in bushy places, on a dry-sandy soil, near Luxillo ; in leaf without either fl. or fr. April 1857. No. **2226**.

The fleshy-fibrous rhizome of this plant is cultivated in small quantities in Angola, and is considered to be the most efficient remedy in cases of gangrenous quinsies (see Welw. Apont. p. 574).

9. **D. elatus** Welw. ex Baker, *l.c.*, p. 214.

PUNGO ANDONGO.—An undershrub, almost a full shrub, 3 to 7 ft. high ; stems erect, branched, as thick as a finger at the base ; branches erect-spreading ; leaflets 3, ovate-orbicular ; flowers violet-purple. In rocky wooded places, at the banks of the river Cuanza, near Mupopo ; fl. and young fr. 30 April 1857. No. **2075***b*.

10. **D. pseudo-cajanus** Welw. ex Baker, *l.c.*, p. 215.

PUNGO ANDONGO.—An erect herb, suffruticose at the base, 2 to 3 ft. high ; flowers whitish-yellow ; standard of a violet tinge ; style always twisted at the base. In wooded tall-grassy meadows, between Caghuy and Candumba ; fl. and young fr. May 1857. No. **2222**.

11. **D. splendens** Welw. ex Baker, *l.c.*, p. 215.

PUNGO ANDONGO.—A perennial erect herb ; stem 2½ to 3 ft. high, simple or loosely branched, marked with several furrows, silky-pubescent as also the stipules petioles pedicels and calyces ; young leaves silvery-velvety, shining ; leaflets lanceolate or narrowly ovate, acute, velvety-tomentose on both surfaces, the younger ones silvery-sparkling beneath ; petioles longer than the leaflets. Stipules and bracts strict. Flowers blue-purple, handsome, almost an inch long, 1 to 3 together in the axils of the leaves, erect ; pedicels ⅙ to ¼ in. long ; bracteoles linear or nearly filiform, very caducous ; style cartilaginous, twisted at the base, dilated for the lower two-thirds, channelled above. In elevated stony pastures, within the fortified lines of Pungo Andongo, near the Salt Spring, in Tunda Quilombo ; fl. from Dec. 1856 to May 1857 ; fr. May 1857, at an elevation of 3800 ft. No. **2223**.

HUILLA.—Leaves narrower, gradually acuminate ; flowers of a brilliant violet-purple colour. In stony thickets, near Lopollo, in Morro de Ferrão da Sola ; fl. and fr. young and ripe Dec. 1859 and Jan. 1860. No. **2224**.

12. **D. Anchietæ** Hiern, sp. n.

Stems and branches subglabrate, rigidly herbaceous or somewhat woody, bluntly angular, or apparently climbing, pale-tawny ; leaves pinnately trifoliolate, pale green and more or less scattered with short hairs above, paler dotted with small reddish glands and often more closely beset with short hairs beneath ; stipules small, ovate, deciduous ; petiole 1 to 3½ in. long ; terminal leaflet ovate or somewhat rhomboid, very obtuse at the apex, obtuse rounded or somewhat emarginate at the base, subcoriaceous or chartaceous, entire or scarcely repand, 1½ to 5 in. long by 1 to 4 in. broad, on

a petiolule of $\frac{1}{2}$ to 1 in.; lateral leaflets sub-oblique or nearly similar, sometimes a little broader especially at the base, on petiolules of $\frac{1}{12}$ to $\frac{1}{4}$ in.; stipels long subulate or setaceous, deciduous, inserted at the base of the lateral petiolules and near the apex at a quasi-joint of the terminal one; racemes axillary lateral and terminal, simple or paniculate, 3 to 12 in. long, shortly pubescent; pedicels short, ranging up to $\frac{1}{4}$ in.; flowers about $\frac{1}{2}$ in. long, numerous; calyx $\frac{3}{8}$ in. long, shortly and closely tawny-pubescent, bibracteolate, cleft two-thirds way down, the two upper lobes connate more than half way, the others lanceolate-oblong, the lowest one rather the longest; bracteoles linear, $\frac{1}{6}$ in. long, deciduous; corolla glabrous; standard apparently dark purple, broader than and about as long as the wing-petals, rather longer than the keel; stamens diadelphous, anthers uniform, obtuse; ovary hairy, 2-ovuled; style glabrous below, hairy above on one side; pods oblanceolate, compressed, a little curved, narrowed at both ends, puberulous, 2-valved, not jointed, 2 in. long by $\frac{1}{2}$ to $\frac{5}{8}$ in. broad; valves firm, almost woody, slightly convex; seeds 2, rather exceeding $\frac{1}{4}$ in. long.

Pungo Andongo.—Lutete, at the sandy margins of woods; fl. and fr. No. **4075**.

Huilla.—In the wooded thickets of Monino; fl. beginning of Feb. 1860. No. **4092**.

This species, with rather broad leaflets, occurs also at Caconda, in the interior of Benguella, where it was collected by Anchieta No. 35, in July 1880, and where it is called "Xipumbulo."

46. **CAJAN** Adans. Fam. Pl. ii. p. 326 (1763). *Cajanus* DC. (1813); Benth. & Hook. f. Gen. Pl. i. p. 541.

1. **C. indorum** Medik. in Vorles. Churpf. Phys. Gesellsch. ii. p. 363 (1787).

Cajanus flavus DC. Cat. Hort. Monsp. p. 86 (1813). *Cajanus indicus* Spr. Syst. Pl. iii. p. 248 (1826); Welw. Apont. p. 573 (1859); Baker in Oliv. Fl. Trop. Afr. ii. p. 216; Ficalho, Pl. Uteis, p. 143 (1884).

Loanda.—Cultivated and spontaneous in fields and by fences near Quicuxe, Imbondeiro dos Lobos, etc.; fl. and fr. March 1854. No. **2227**.

Dande.—Fruit, in August 1860, semi-spontaneous and cultivated. Coll. Carp. 435.

Golungo Alto.—An undershrub, here and there a shrub of 3 to 4 ft. in height, loosely and erectly branched; stem and older branches bare of leaves below for a considerable distance; cultivated and spontaneous, almost everywhere, perhaps indigenous, by roadsides and in nearly all places of neglected cultivation, from Icolo to Sange, near Trombeta in Sept., near Sange in Oct. 1854; fl. and fr. No. **2228**.

The native name in Angola is "Jinsonge" or "Quinsonge."

47. **DOLICHOLUS** Medik. in Vorles. Churpf. Phys. Ges. ii. p. 354 (1787). *Rhynchosia* Lour. (1790); Benth. & Hook. f. Gen. Pl. i. p. 542.

1. **D. angolensis.**

Cyanospermum angolense Welw. Apont. p. 586, n. 32. *Rhynchosia congensis* Baker in Oliv. Fl. Trop. Afr. ii. p. 217; vel affinis.

GOLUNGO ALTO.—A twining and widely climbing herb or undershrub; in the living state with green-yellowish indumentum; standard sulphur-yellow, variegated longitudinally with purple lines; wings sulphur-yellow; keel sulphur-yellow, variegated longitudinally with purple lines, becoming at the apex wholly purple; pod 2-seeded; seeds beautifully deep-blue. Rather rare, by thickets, near Sange; fl. end of May 1855. No. **4067**. In thickets; fr. July 1857. COLL. CARP. 454.

CAZENGO.—Petals yellow, even after the fecundation of the flower, afterwards becoming rigid and tinged with red-brown, lengthening with the pod, persistent and together with the calyx embracing the pod. Rather rare, by thickets, along the banks of the river Luinha; scarcely ripe fr. 11 June 1855. No. **4066**. At the base of the Muxâulo mountain, sparingly; seeds middle of June 1855. COLL. CARP. 453.

2. **D. calycinus.**

Rhynchosia calycina Guill. & Perr. Fl. Senegamb. p. 214 (1832); Baker, *l.c.*, p. 217.

SIERRA LEONE.—A widely but not high climbing shrub, with purple-red flowers (when dried), and pretty deep-blue seeds. In bushy mountainous situations, behind Freetown; fl. and fr. without foliage, Sept. 1853. No. **4065**. A climbing undershrub; seeds. COLL. CARP. 452.

3. **D. minimus.**

Rhynchosia minima DC. Prodr. ii. p. 385 (1825); Baker, *l.c.*, p. 219.

LOANDA.—An annual herb, procumbent or sometimes scandent; flowers yellow; keel and wing-petals included in the standard; standard sprinkled on the back with brownish waxy-glandular points. Rather rare, in moist thickets near Imbondeiro dos Lobos; fl. beginning of May 1858. No. **4070**.

4. **D. caribæus.**

Rhynchosia caribæa DC. Prodr. ii. p. 384 (1825); Baker, *l.c.*, p. 220.

LOANDA.—Boa Vista; fl. and fr. Feb. 1858. No. **4091**.

ZENZA DO GOLUNGO.—A climbing herb, with a woody many-headed rootstock, numerous stems, and orange-yellow flowers. Sparingly in thickets near the river Calucala; fl. and fr. Sept. 1857. No. **4090**.

5. **D. Memnonia.**

Rhynchosia Memnonia DC. Prodr. ii. p. 386 (1825); Baker in Oliv. Fl. Trop. Afr. ii. p. 220.

AMBRIZ.—Bank of the river Quisembo; fl. and fr. Nov. 1853. No. **4088**.

LOANDA.—Imbondeiro dos Lobos; fl. and fr. Feb. 1858. No. **4087**. A herb apparently perennial, at least persisting for several years; stems prostrate or ascending-scandent, elongated; flowers yellowish. Sporadic, in moist thickets near Imbondeiro dos Lobos; fl. and few fr. 8 June 1858. No. **4086**.

BARRA DE BENGO.—A twining herb, sometimes widely climbing, at other times nearly prostrate, with the stems disposed in a circle; flowers from yellow to reddish or deep-yellow. In open palm-groves at the banks of the river Bengo; fl. and fr. Dec. 1853. No. **4089**.

AMBACA.—A dwarf undershrub, hardly different from a herb, perennial, with a woody many-headed rootstock, prostrate stems always becoming somewhat woody, and ascending flowering branches; flowers yellow, with purple calyx. Abundant, but only in a few localities, in sandy wooded stations between Halo and Zemba; fl. Oct. 1856. No. **4084**.

PUNGO ANDONGO.—Fl. and fr. No. **4085**.

Mossamedes.—Flowers dark-yellow. In grassy situations near the river Bero; fl. and fr. end of June 1859. No. **4083**.

Var. **candidus** (Welw. ms. in Herb.). *R. Memnonia* β. Baker, *l.c.*, p. 221, *pro parte*.

A twisted undershrub, woody at the base, almost a little shrub, or a decumbent suffruticose herb, incano-tomentellous or cinereo-glaucous all over; flowers solitary, yellow.

Mossamedes.—Sparingly leafy. In sandy sub-maritime places near Saco de Giraul; fl. (unique) and fr. 19 July 1859. No. **4069**. On the sides of the mountains of Serra de Montes Negros, near Rio do Sal; without either fl. or fr. 10 and 19 August 1859. No. **4068**.

This variety approaches very nearly *R. Schimperi* Hochst. ex Boiss. Fl. Orient. ii. p. 626 (1872).

6. **D. filicaulis.**

Rhynchosia filicaulis Welw. ex Baker, *l.c.*, p. 221.

Bumbo.—Flowers purplish. Rather rare, in fields after cultivation of *Arachis hypogæa* L., near Bumbo; fl. and fr. Oct. 1859. No. **4093**.

7. **D. lætissimus.**

Rhynchosia latissima Welw. ex Baker, *l.c.*, p. 221.

Cazengo.—A handsome undershrub, climbing with its stems (15 ft. long or more) on trees and quite covering them with its delightfully yellow flowers; leaflets minutely pellucid-punctate; calyx gibbous at the base near the insertion of the standard; ovary densely resinous-punctate; ovules 2. In wooded bushy situations at the edges of forests on the left bank of the river Luinha; fl. June 1855. No. **4074**.

The transference of the species from *Rhynchosia* to *Dolicholus* allows the restitution of Welwitsch's trivial name as it appears in his ms.

8. **D. procurrens** Hiern sp. n.

A perennial herb; stems numerous, decumbent, pubescent, slender, elongated, sulcate-striate; leaves pinnately trifoliolate, 2 to 3 in. long; common petiole shortly pubescent, below the leaflets 1 to 1½ in. long; stipules lanceolate, acute, $\frac{1}{12}$ to $\frac{1}{8}$ in. long; terminal leaflet depressedly orbicular-ovate, obtusely narrowed and sometimes mucronulate at the apex, broadly rounded or subcordate at the base, entire, thinly coriaceous, glabrate or nearly so above, shortly hairy on the veins and scattered with minute glands beneath, $\frac{2}{3}$ to 1 in. long by $\frac{3}{4}$ to 1½ in. broad; terminal petiolule $\frac{1}{3}$ to $\frac{1}{2}$ in. long, jointed and often bent near the apex; lateral leaflets more or less unequal-sided, otherwise similar to the terminal one, on short pubescent pedicels; stipels small, subulate, at the base of the lateral petiolules and at the joint of the terminal petiolule; flowers orange-yellow, about $\frac{1}{2}$ in. long; on pubescent pedicels $\frac{1}{12}$ to $\frac{1}{6}$ in. long, arranged in terminal and sub-terminal many-flowered racemes or panicles longer than the leaves; calyx shortly pubescent, $\frac{1}{3}$ in. long; tube campanulate, $\frac{1}{8}$ in. long; lobes ovate or lanceolate; corolla glabrous.

Huilla.—In sandy sparingly-bushy pastures near Humpata; fl. and young fr. April 1860. No. **4071**.

Related to *D. adenodes* (*Rhynchosia adenodes* Eckl. & Zeyh.), differing by denser inflorescence, larger flowers and less conspicuous glands on

the underside of the leaves; it differs also from *D. lætissimus* by shorter not acuminate leaflets, denser inflorescence and smaller flowers.

9. **D. debilis.**

Rhynchosia debilis G. Don, Gen. Syst. ii. p. 347 (1832); Baker, *l.c.*, p. 222.

Golungo Alto.—A widely but not high climbing herb; flowers yellowish, variegated with deep violet-purple lines. Sporadic, in the wooded thickets of Quibanga; fl. and fr. June 1856. No. **4073**.

10. **D. violaceus** Hiern, sp. n.

A twining widely climbing herb, sometimes prostrate; stems softly grey-hirsute, terete; leaves trifoliolate, somewhat pubescent; petiole $\frac{1}{2}$ to $2\frac{1}{2}$ in. long; stipules lanceolate, $\frac{1}{4}$ in. long, somewhat pubescent outside, nearly glabrous inside; terminal leaflet broadly orbicular-ovate, narrowed to an acute or acuminate apex, truncate or obtusely narrowed or subcordate at the base, membranous, entire, scattered with minute glands, dull green above, paler beneath, with short hairs at least on the veins beneath, $1\frac{3}{4}$ to $3\frac{1}{2}$ in. long and broad, on a petiolule of $\frac{1}{2}$ to 1 in.; lateral leaflets unequal-sided, otherwise similar to and about as long as the terminal one, on short petiolules; stipels very small, setaceous, near the apex at a bend of the terminal petiolule, also at the base of the lateral ones, deciduous; racemes axillary or lateral, many-flowered, simple or divided, (including a peduncle of $1\frac{1}{2}$ to 3 in.) 4 to 9 in. long, puberulous; pedicels very short; bracteoles sub-linear, deciduous; flowers violet-blue and variegated with yellow, $\frac{1}{2}$ in. long, deflexed; calyx $\frac{1}{5}$ in. long, scattered with short hairs, tube $\frac{1}{8}$ in. long, teeth ovate, the lowest somewhat prolonged, the upper two connate half way; standard hairy on the back; petals of the keel $\frac{3}{8}$ in. long, with a long claw at the base; wing-petals shorter, clawed at the base, adhering at the middle to the keel, with a spur a little below the middle; style glabrous towards the apex, exceeding the andrœcium; ovary densely hirsute with pallid hairs; pods pendulous, crowded, oblong, rather widened above the middle, pointed at the apex to the base of the often persistent style, hirsute with rigid pilose hairs glistening with gold colour and having a glandular base, 1 in. long by $\frac{1}{3}$ in. broad; seeds 2.

Golungo Alto.—At the bushy margins of palm-groves along the banks of the streams Delamboa and Cate, not abundant; fl. and fr. end of May 1856; also one specimen in wooded thickets among the mountains of Queta, fl. end of June 1856. No. **4080**. Catomba, Luinha, fl. July 1856. No. **4081**.

11. **D. luteolus** Hiern, sp. n.

Stems diffuse or scandent, more or less pubescent and glandular, terete; leaves trifoliolate, somewhat pubescent; petiole 2 to 3 in. long; stipules ovate, $\frac{3}{8}$ in. long, pubescent outside, glabrous inside; terminal leaflet broadly orbicular-ovate, narrowed to an acute apex, somewhat cordate at the base, entire, membranous, softly pubescent especially on the veins beneath, scattered with small glands, 2 to 4 in. long and broad, on a petiolule of $\frac{1}{2}$ to 1 in.; lateral leaflets unequal-sided, otherwise similar to and about as

long as the terminal one, on very short petiolules; stipels small, setaceous, near the apex at a bend of the terminal petiolule, also at the base of the lateral ones; racemes axillary lateral or quasi-terminal, many-flowered, simple or divided, (including a peduncle of 1 to 3 in.) 3 to 12 in. long, pubescent; pedicels short, about $\frac{1}{12}$ in.; bracteoles lanceolate-subulate, deciduous; flowers $\frac{3}{4}$ in. long, patent or drooping; calyx shaggy outside, $\frac{3}{8}$ in. long; tube $\frac{1}{8}$ in. long, teeth subulate, the upper ones connate half way; standard densely pubescent on the back; petals of the keel $\frac{5}{8}$ in. long, with a long claw at the base; wing-petals shorter, clawed at the base, adhering in the middle to the keel; style glabrous towards the apex; pods shaggy, $1\frac{1}{3}$ in. long by $\frac{3}{8}$ in. broad, clothed with bright yellowish hairs when young, patent or drooping; seeds 2.

Golungo Alto.—A diffuse, often scandent herb, but in bare spots running out far horizontally; corolla pale sulphur-yellow, keel and standard marked towards the apex with purple lines, wing-petals deep-yellow. In uncultivated situations at the sides of thickets near Menha-Lula; fl. and fr. June 1855. No. **4078**. A suffruticose annual herb, wholly viscid, climbing widely; flowers sulphur-yellowish, with the keel violet-coloured at the apex. By thickets along the borders of forests in Sobato de Mussengue; fl. May and July 1856. No. **4079**.

Pungo Andongo.—In flower. No. **4082**.

Nearly related to *Rhynchosia stipulosa* A. Rich., which Baker (*l.c.*, p. 222) united with *R. viscosa* DC.

12. **D. ambacensis** Hiern, sp. n.

An erect or ascending herb, hoary- or somewhat tawny-silvery tomentellous, $1\frac{1}{2}$ ft. high or more; rootstock woody perennial; stem and branches firm, sub-terete; leaves trifoliolate or occasionally unifoliolate; stipules lanceolate, hairy outside, glabrous inside, $\frac{1}{4}$ to $\frac{3}{8}$ in. long, deciduous; stipels subulate, hairy, small, very deciduous; petiole $\frac{2}{3}$ to $1\frac{1}{2}$ in. long; terminal leaflet rhomboid or reniform-orbicular, obtusely narrowed to an apiculate apex, cordate or hollowed at the base, entire, subcoriaceous, softly tomentellous especially beneath, scattered on both sides with minute sessile glands, $1\frac{1}{2}$ to 3 in. long by $1\frac{1}{2}$ to 4 in. broad on a petiolule of $\frac{3}{8}$ to $\frac{1}{2}$ in.; lateral leaflets unequal-sided, otherwise similar and about the same length, on very short petiolules; flowers bright yellow, $\frac{1}{2}$ in. long, numerous, arranged in axillary and sub-terminal simple or branched racemes of 2 to 4 in.; pedicels ranging up to $\frac{1}{6}$ in.; bracteoles like the stipules but smaller and often much narrower; calyx $\frac{3}{8}$ in. long, shortly pubescent, tube $\frac{1}{8}$ in. long, lowest lobe lanceolate-acuminate longer than the others, the two upper lobes connate about half way; standard somewhat hairy on the back, the other petals glabrous; stamens diadelphous; ovary hairy; style glabrous above; pods oblanceolate, compressed, more or less scattered with long hairs, closely beset with minute sessile glands, a little curved, 2-seeded with a transverse depression on both sides between the seeds, 2-valved, about 1 in. long by $\frac{1}{4}$ in. broad or a little larger; seeds $\frac{1}{6}$ in. long.

Ambaca.—Abundant, in dry sandy-clayey thickets between Izanga and Ambaca; fl. and fr. Oct. 1856. No. **4077**.

13. **D. huillensis** Hiern, sp. n.

A robust herb, apparently erect, silvery-tomentose in most parts, more than 2 ft. high; stems and branches sub-terete, leafy; leaves trifoliolate, 3 to 5 in. long; petiole firm, $\frac{1}{2}$ to $1\frac{1}{4}$ in. long; stipules lanceolate, about $\frac{1}{6}$ in. long, deciduous; stipels subulate, small, at the base of the short lateral petiolules and near the apex of the terminal petiolule; terminal leaflet orbicular-ovate, somewhat triangular as to the upper third part, pointed at the apex, slightly cordate at the base, coriaceous, velvety on both surfaces, entire, 2 to 3 in. long and broad or sometimes a little larger; lateral leaflets rather smaller and somewhat one-sided, otherwise similar; terminal petiolule $\frac{1}{2}$ to 1 in. long, more or less bent near the apex at the insertion of the stipels; flowers yellow-tawny, $\frac{5}{6}$ to $\frac{7}{8}$ in. long; calyx densely hairy outside, about as long as the corolla, tube $\frac{1}{6}$ in. long, lobes lanceolate acute, the lowest prolonged, longer than the others, upper lobes connate half way, $\frac{1}{3}$ to $\frac{2}{5}$ in. long, equalling the intermediate ones; standard hairy on the back; keel and wings glabrous; stamens diadelphous; ovary hairy, style glabrous towards the apex; ovules 2; racemes many-flowered, axillary and subterminal, crowded near the extremities of the stem and branches; $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long; pedicels densely hairy, ranging up to $\frac{1}{2}$ in. long; bracteoles small, deciduous. Pods not seen.

Huilla.—In wooded situations among shrubs and tall herbage between Eme and the lake Ivantâla; fl. beginning of April 1860. In the drier thickets at the borders of forests near the lake Ivantâla; fl. end of Feb. No. **4076**.

14. **D. venulosus** Hiern, sp. n.

A pubescent undershrub, 1 to 2 ft. high; rootstock woody, few-headed; stems branched near the base, at the apex erect or sarmentose-scandent; branches sub-terete, rather slender, leafy below, leaves pinnately trifoliolate, 1 to 2 in. long; common petiole closely pubescent, below the leaflets $\frac{1}{8}$ to $\frac{1}{2}$ in. long; stipules lanceolate or ovate, acute, $\frac{1}{8}$ to $\frac{1}{6}$ in. long; terminal leaflet lanceolate-oblong, obtuse and mucronulate at the apex, rounded or slightly cordate at the base, entire, thinly coriaceous, nearly glabrescent above, rather paler hairy on the veins and scattered with minute glands beneath, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long by $\frac{1}{3}$ to $\frac{2}{3}$ in. broad; reticulation clearly marked on both surfaces, paler above and in relief beneath; terminal petiolule $\frac{1}{8}$ to $\frac{1}{4}$ in. long, inconspicuously jointed and often bent near the apex; lateral leaflets unequal-sided and rather smaller, otherwise similar to the terminal one; stipels minute, narrow, deciduous; peduncles axillary, shortly hairy, slender, 2-4-flowered, 1 to $1\frac{1}{4}$ in. long; pedicels $\frac{1}{12}$ to $\frac{1}{6}$ in. long; flowers $\frac{2}{5}$ to $\frac{1}{2}$ in. long; calyx pubescent, $\frac{1}{3}$ in. long, narrow; tube $\frac{1}{12}$ in. long; lobes lanceolate-subulate; corolla glabrous; pod oblanceolate, compressed, somewhat hairy, not stipitate, slightly curved, $1\frac{1}{6}$ in. long by $\frac{1}{3}$ in. broad; seeds 2; funicle central on the hilum.

Huilla.—Sporadic, in shortly-bushy pastures between Catumba and

Ohay, in company with various species of *Crotalaria* ; ripe fr. and few fl. beginning of April 1860. No. **4072**.

Related to the Cape *D. puberulus* (*Rhynchosia puberula* Harv.), differing by longer inflorescence ; also still more so to *D. viscidulus* (*Rhynchosia viscidula* Steud.) from which latter it differs by shorter petioles, longer and more oblong leaves, and shorter inflorescence.

48. **ERIOSEMA** Reichenb. ; Benth. & Hook. f. Gen. Pl. i. p. 543.

1. **E. psoraleoides** G. Don, Gen. Syst. ii. p. 348 (1832).

E. cajanoides Hook. f. & Benth. in Hook. Niger Fl. p. 314 (1849); Baker in Oliv. Fl. Trop. Afr. ii. p. 227 ; Baker f. in Journ. Bot. 1895, p. 144.

Golungo Alto.—A shrubby bush, 5 to 6 ft. high, with a single trunk and spreading branches above ; leaflets mucronate or cuspidate with an obtuse apex, lateral veins reaching the margin ; stipules acute or obtuse ; standard obcordate, emarginate, with an acute sinus. Between Trombeta and Cabondo, Sept. 1854 ; N-delle in June ; on hills in company with species of "Marianga" (*Pennisetum*) and *Andropogon*, near Cacuse in Lower Queta, end of May 1855 ; in fl. and fr. No. **4095**.

Pungo Andongo.—In fl. and fr. (no notes). No. **4115**.

Bumbo.—In the wooded pastures of Bruco, in Serra da Xella, sparingly ; fl. and fr. Sept. 1859. No. **4118**.

Huilla.—An undershrub, 2 to 4 ft. high, erect; flowers golden-yellow. In the drier thickets of Monino ; fl. and fr. beginning of April 1860. No. **4117**.

2. **E. ramosum** Baker f. in Journ. Bot. 1895, p. 146.

Huilla.—A small shrub or undershrub, 1½ to 2 ft. high, with yellow flowers. In thickets on the pastures of Morro de Lopollo ; fl. and very sparingly fr. April 1860. No. **4116**.

Perhaps a variety of *E. flemingioides* Baker ; see Baker f., *l.c.*, p. 236.

3. **E. andongense** Hiern in Journ. Bot. 1895, p. 148.

Pungo Andongo.—In wooded pastures at Sansamanda in Pedras de Guinga ; fl. and fr. April 1857. No. **4119**.

The following No. perhaps belongs to the same species ; it differs by having rather larger flowers with a shorter calyx :—

Huilla.—Flowers yellow. Descent from Morro de Lopollo, near Humpata, in thickets subject to annual burning ; sparingly fl. and fr. Dec. 1859. No. **4120**.

4. **E. griseum** Baker in Oliv. Fl. Trop. Afr. ii. p. 228 ; Baker f. in Journ. Bot. 1895, p. 227.

Golungo Alto.—An undershrub, 2 to 3½ ft. high, with yellow flowers ; in fl. at Menha Lula May 1855. No. **4106**.

Zenza do Golungo.—A silky-hoary undershrub ; root thick, woody, many-headed, perennial ; stems erect ascending or oblique ; leaves softly coriaceous ; flowers deep-yellow. About 6 in. high ; an instance of the depauperated vegetation of the mountains of this district. In the drier stony parts of mountains, near Quicanda up to Tanderoxique, in flower in Sept. 1854 : not uncommon in open rocky places on the left bank of the river Xixe ; fl. Sept. 1857. No. **4104**.

Ambaca.—A silvery-hoary undershrub, ½ to 1 ft. high ; root thick, woody, many-headed ; stems ascending, branched ; branches and branchlets terminating in heads of yellow flowers. Habit nearly that

of *Cytisus*. In the drier thickets between Isange and N-gombe ; fl. and fr. Oct. 1856. No. **4105**.

5. **E. glomeratum** Hook. f. & Benth. in Hook. Niger Fl. p. 313 ; Baker, *l.c.*, p. 228 ; Baker f. in Journ. Bot. 1895, p. 228.

Ambriz.—By the river Quizembo ; without either fl. or fr. Nov. 1853. No. **4109**.

Golungo Alto.—An erect undershrub, or herb becoming woody at the base ; flowers yellow, capitate ; rather sparingly in reed-beds, Serra de Alto Queta, above Camilungo ; with ripe fr. August 1856. No. **4108**. In fl. and fr. ; no notes. No. **4107**.

6. **E. pygmæum** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 225 ; Baker f. in Journ. Bot. 1895, p. 229.

Huilla.—Flowers yellowish, with a purple keel. In wooded thickets near Mumpulla, at an elevation of 4000 ft., in company with species of *Thesium* and *Thunbergia* ; fl. Oct. 1859. No. **4123**.

7. **E. Welwitschii** Hiern in Journ. Bot. 1895, p. 229.

Ambaca.—A dwarf perennial herb, with decumbent tenacious stems becoming woody at the base, and deep-yellow flowers. Not uncommon in sandy sparingly grassy situations at the banks of the Pampa stream near Ambaca ; fl. and fr. Oct. 1856. No. **4121**.

8. **E. cyclophyllum** Welw. ex Baker f. in Journ. Bot. 1895, p. 231.

Huilla.—A perennial herb ; rootstock many-headed, tuberous-filipendulous ; stems sub-cæspitose, prostrate-ascending ; leaves orbicular, subsessile ; flowers orange-purplish. In shortly bushy rather rocky pastures about Lopollo, but by no means abundant ; fl. and fr. Dec. 1859. No. **4096**.

9. **E. prunelloides** Welw. ex Baker f. in Journ. Bot. 1895, p. 232.

Pungo Andongo.—In sandy thickets near Condo ; fl. and fr. March 1857. No. **4100**.

10. **E. gracile** Welw. ex Baker f. in Journ. Bot. 1895, p. 233 ; non Klotzsch.

E. gracillimum Baker f., *l.c.*, p. 232.

Pungo Andongo.—In marshy meadows near Sansamanda ; fl. and fr. May 1857. No. **4098**.

This species, with its weak prostrate stems, and pods much exceeding the calyx, fluctuates, as Welwitsch remarks in his ms. note, between this genus and *Dolicholus*. Since Klotzsch's *E. gracilis* has been reduced to a synonym of *E. glomeratum* Hook. f. & Benth., there appears no necessity to neglect Welwitsch's name.

11. **E. psiloblepharum** Welw. ex Baker f., *l.c.*, p. 233.

Pungo Andongo.—At Quitage, in the rainy season ; fl. and fr. March 1857. No. **4101**.

12. **E. leucanthum** Welw. ex Baker f., *l.c.*, p. 234.

Huilla.—Root napiform ; flowers whitish-yellowish ; calyx deeply 5-lobed ; lobes narrow nearly equal among themselves, many times longer than the tube ; petals all clawed ; standard obovate, not appendaged ; wings narrow, almost sigmoid ; keel curved, obtuse ; vexillary stamen free ; ovary sessile, pilose, 2-ovuled ; style elongate-filiform, curved in the middle, below the capitate and thinly papillose stigma somewhat flatly dilated ; pods oblong-suborbicular, 2-seeded. In hilly almost bushy situations near Lopollo ; fl. and fr. Dec. 1859. No. **4099**.

13. **E. terniflorum** Hiern in Journ. Bot. 1895, p. 234.

Huilla.—Rhizome furnished with elongated tubers; flowers yellowish. In wooded bushy places near Nene; fl. Nov. 1859. No. **4122**.

14. **E. filipendulum** Welw. ex Baker f., *l.c.*, p. 235.

Huilla.—Flowers whitish. In dry thickets near Lopollo; fl. and fr. Dec. 1859. No. **4097**.

15. **E. ellipticum** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 227; Baker f. in Journ. Bot. 1895, p. 236.

Huilla.—An erect sparingly branched undershrub, 2 to 3 ft. high; leaves unifoliolate, oval-oblong, $1\frac{1}{2}$ to 3 by $\frac{1}{2}$ to 1 in., with resinous dots on both surfaces, deciduous when old at the time of the flower; stipules lanceolate, small, early caducous; stipels subulate, $\frac{1}{10}$ in. long, caducous; flowers yellow; style filiform, not dilated towards the apex; pod compressed, elliptical, obliquely pointed, $1\frac{1}{4}$ by $\frac{2}{5}$ in.; seeds 2. Very rarely met with, in stony thickets at the margins of forests, between Mumpulla and Humpata, at an elevation of about 4000 ft.; in leaf in Oct. and sparingly in fl. and fr. Dec. 1859. No. **4102**.

16. **E. Muxiria** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 229; Ficalho, Pl. Uteis, p. 143 (1884); Baker f. in Journ. Bot. 1895, p. 236.
Muxiria utilis Welw. Apont. p. 573.

Pungo Andongo.—An undershrub; stems erect, hard-woody at the base; root very thick, obliquely descending, forming a fleshy tuber 2 in. long and 1 in. in diam., surrounded by thinner equally fleshy lateral fibres 4 to 6 ft. long; leaves pinnately trifoliolate; leaflets stipellate, sinuous or repand at the margin, silky-strigose and silvery-glistening on the lower surface, with resinous glands difficult to discern; stipels striate, persistent; peduncles and racemes very straight; flowers almost blue or violet, variegated with yellow and purple; bracts persistent at the base of the calyx; ovary 2-seeded. The roots are employed, together with the fruits of the species of *Eleusine* called "Luco," for the purpose of making a kind of beer called "Oála." The plant is indigenous along the banks of the Cuanza, and is at times cultivated. In fl. from May to July, also in Oct. and Nov.; very frequent in the rocky rather dry woods at the banks of the river Cuanza, near Mopope, etc.; fl. 1 May 1857. Native name "Muxiri" or "Mugiri." No. **4094**.

17. **E. flemingioides** Baker in Oliv. Fl. Trop. Afr. ii. p. 229; Baker f. in Journ. Bot. 1895, p. 236.

Golungo Alto.—An almost suffruticose herb, with ascending stems 2 to 3 ft. high; flowers variegated with yellow and purple. Rather rare by the lower dense thickets along the banks of the river Coango; fl. and fr. May 1856. No. **4112**.

Cazengo.—Habit that of the genus *Flemingia*; leaves stipellate; flowers yellowish; at Dalatanda; fl. June 1855. No. **4113**.

Pungo Andongo.—Near the rivulet Niege; fl. and young fr. May 1857. No. **4110**. An undershrub, 3 to 4 ft. high, with yellow flowers. In wooded thickets, Pedras de Guinga, between Caghuy and Calungo; fl. and young fr. April 1857. No. **4111**.

Our specimens differ from the type of the species by the branches being straighter and but little bent, by greater variability in the shape of the leaflets being in most cases narrower, and by the sub-paniculate racemes in the case of some of the Pungo Andongo specimens.

18. **E. speciosum** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 230; Baker f. in Journ. Bot. 1895, p. 236.

Huilla.—A handsome undershrub, 2½ to 4 ft. high, erect, becoming very woody at the base; leaflets stipellate, sub-pellucid-punctate, with glistening hairs; flowers yellow; keel tawny-purplish; young pods short, compressed, 2-seeded. In thickets at the borders of forests near Catumba; fl. and young fr. April 1860. No. **4103.**

49. **AMERIMNON** P. Browne, Jam. p. 288, t. 32, f. 3 (1756). *Dalbergia* L. f. Suppl. Pl. p. 52 (1781); Benth. & Hook. f. Gen. Pl. i. p. 544. *Ecastaphyllum* P. Browne, *l.c.*, p. 299, t. 32, f. 1; Benth. & Hook. f., *l.c.*, i. p. 545.

1. **A. hostile** O. Kuntze, Rev. Gen. Pl. i. p. 159 (1891).

Dalbergia hostilis Benth. in Journ. Linn. Soc. iv. Suppl. p. 33 (1860); Baker in Oliv. Fl. Trop. Afr. ii. p. 232; Ficalho, Pl. Uteis, p. 144 (1884).

Golungo Alto.—A remarkable shrub, robust, arborescent, climbing to a great height and then hanging a long way down; older trunks (in the primitive forests) flattened, 5½ to 12 in. wide, ½ to 1½ in. thick, in the form of a band, armed with clustered spines coalescent at the base 1½ in. long; younger stems (in secondary woods) several from the same rootstock, cæspitose, erect, 3 to 5 ft. high, terete, armed with separate spines, and in this state even bearing flowers and fruits; when 2 to 3 ft. high, occasionally flowering but more rarely fruiting; leaflets glaucescent; flowers white. Frequent throughout the district, especially in Alto Queta, Mussengue, and at the spring of Capopa; fl. Oct. and Dec. 1854, fr. Nov. 1854 and March 1855. Native name "Páo Quisembe." No. **1880** and Coll. Carp. 539.

The stem is thoroughly dried in the sun by the negroes and then serves them for tinder; a piece of it 2 ft. long, if ignited at one end, will glow almost the whole day and afford the means of lighting a fire at any moment. Younger stems about 2 in. wide are used as hoops for barrels and drums.

The following No., with much larger leaflets, is apparently different, but may be mentioned here:—

Golungo Alto.—A shrub climbing high and widely, with the habit of *A. pubescens* O. K., but with entirely different foliage; abortive branchlets recurved in a spiral manner. In the primitive forest of Mata de Quibanga, near Sange; leafy branches without fl. July 1857. No. **1894.**

2. **A. Brownii** Jacq. Enum. Pl. Carib. p. 27 (1760).

Ecastaphyllum Brownei Pers. Syn. Pl. ii. p. 277 (1807); Baker, *l.c.*, p. 236. *Dalbergia malifolia* Welw. ex Baker, *l.c.*, p. 233. *A. malifolium* O. Kuntze, *l.c.*, p. 159.

Prince's Island.—A handsome leafy tree, 25 ft. high, with the habit of a luxuriant apple tree; flowers whitish, with a rose-red tinge. Abundant, in company with *Turræa procera* Welw. (Herb. No. 1299), near the sea-shore, in the dense woods of Bahia de S. Antonio; fl. Sept. 1853. No. **1886.**

3. **A. pubescens** O. Kuntze, Rev. Gen. Pl. i. p. 159 (1891).

Dalbergia pubescens Hook. f. in Hook. Niger Fl. p. 315 (1849); Baker, *l.c.*, p. 234.

Golungo Alto.—A very elegant bushy shrub, sometimes standing erect, sometimes climbing far and widely ; trunk at the base as thick as a man's arm or thicker ; branches shoots and calyces red-purple ; flowers very beautiful, changing colour, at first reddish, then yellowish, and afterwards turning nearly whitish, lasting for a long time in the state of bud (buds seen much swelled in the month of January, and in March scarcely fully open) ; standard reflexed ; wings straight ; keel incurved, obtuse, half as long as the standard and wings. Sporadic, in primitive forests throughout the district ; in Sobato de Bumba at about 2000 ft. of elevation ; fl. March 1855 ; in Sobato de Quilombo and Mussengue ; fl. April 1856 and May 1855. No. **1875**. A widely climbing shrub with whitish red-striate flowers ; in the dense primitive forests of Menha Lula, Sobato de Mussengue ; flower-bud June 1856. No. **1875***b*.

Cazengo.—An erect shrub, 6 ft. high, resembling a *Cassia* in habit, very elegant ; leaflets alternate, bright-green above, paler beneath ; flowers orange-red when in bud, in the expanded state yellowish, at length almost whitish ; fruit in a manner samaroid, oblong, $3\frac{2}{5}$ in. long by $1\frac{2}{5}$ in. broad. In secondary thickets at the skirts of woods, between Cambondo and Dalatanda, sparingly ; scantily in fl. and a unique fr., June 1855. No. **1876**.

4. **A. nitidulum** O. Kuntze, Rev. Gen. Pl. i. p. 159 (1891).
Dalbergia nitidula Welw. ex Baker, *l.c.*, p. 235.

Ambaca.—An extensive tree, 25 to 35 ft. high ; trunk 1 to 2 ft. in diam. ; crown depressed-dilated ; branchlets at the time of full flowering quite leafless ; flowers white or whitish-red. Calyx-teeth one-third of the length of the calyx ; the upper teeth deltoid, broader and cohering higher than the others ; the three lower ones narrower, nearly equal in length ; standard deeply obcordate, exappendiculate, as long as the wings ; keel shorter than the wings ; all five petals with a rather long claw ; stamens divided into two equal phalanges ; anthers uniform, subversatile, seated in a peltate manner on the filaments ; ovary with a long stipes, sub-falcate, hairy ; style incurved, glabrous ; stigma rather small, terminal. Sporadic, in open sandy forests between Zamba and the river Lutete ; fl. 7 June 1857. No. **1885**.

5. **A. Bakeri** O. Kuntze, Rev. Gen. Pl. i. p. 159 (1891).
Dalbergia Bakeri Welw. ex Baker, *l.c.*, p. 235.

Golungo Alto.—A handsome stout much-branched evergreen shrub, climbing far and widely ; flowers white ; ovary long-stipitate, glabrous ; ovules few. Sparingly in the primitive forests near the stream Delâmboa, also in the Mata Grande de Queta in one spot only ; fl. Jan. 1856. No. **1882**.

6. **A. macrospermum** O. Kuntze, Rev. Gen. Pl. i. p. 159 (1891).
Dalbergia macrosperma Welw. ex Baker, *l.c.*, p. 235.

Golungo Alto.—An ample robust shrub, climbing to a great height ; flowers whitish ; seed very large in proportion to the pod. Frequent in the elevated primitive forests of Alto Queta ; fl. Jan. 1856, fr. May 1855. No. **1881**.

The following No. is represented by flowering branches without leaves ; it seems best mentioned under *Amerimnon* :—

Huilla.—A small stunted tree of a man's height, apparently mutilated by fire, with tortuous branches and branchlets, leafless at the time of gathering ; flowers whitish-yellow ; calyx bibracteolate at

the base ; teeth one-third the length of the calyx, the two upper teeth broader, the lowest tooth narrower and a little longer than the rest ; corolla glabrous ; standard obcordate, as long as the auriculate wings, with a rather broad claw ; keel much shorter than the wings, the two petals cohering at the top of the back ; stamens divided into two equal phalanges, or the upper one free ; anthers uniform, versatile, all fertile ; ovary narrowly oblong, compressed, glabrous except the sparingly hairy edges, stipitate ; ovules few ; style glabrous, at first slightly afterwards hookedly incurved. In rocky dry sparingly bushy places above the village of Mumpulla ; only one plant fl. Sept. 1859. No. **1883**.

50. **DREPANOCARPUS** G. F. W. Meyer ; Benth. & Hook. f. Gen. Pl. i. p. 546.

1. **D. lunatus** G. F. W. Meyer, Prim. Fl. Esseq. p. 238 (1818) ; Welw. Apont. p. 587, n. 39 (1859) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 237.

Libongo.—A small tree, 10 to 15 ft. high, tortuously and much branched, beset with stipular reflexed geminate spines ; leaflets obovate, emarginate ; flowers violet-purple, sweetly scented. At the banks of the river Lifune (otherwise called Lufune), near its mouth, in near company with *Rhizophoræ*, frequent ; fl. and young fr. middle of Nov. 1853. No. **1873**.

Barra do Dande.—Common as a shrub, rarer as a small tree of 8 to 15 ft. At the marshy margins of the river Dande, near Barra do Dande, in company with *Acrostichum aureum* L. No. **1874**. An arborescent shrub with purplish flowers ; fr. Sept. 1858. Coll. Carp. 436. (A unique specimen.)

51. **PTEROCARPUS** L. ; Benth. & Hook. f. Gen. Pl. i. p. 547.

1. **P. mellifer** Welw. Synopse, p. 14, n. 31 (*meliferus*) (1862) ; Baker in Oliv. Fl. Trop. Afr. ii. p. 239 (*melliferus*) ; Ficalho, Pl. Uteis, p. 145 (1884) (*melliferus*).

Lingoum melliferum O. Kuntze Rev. Gen. Pl. i. p. 193 (1891).

Pungo Andongo.—One of the handsomest trees of the primitive forests, usually 50 to 80 ft. high, occasionally 100 to 120 ft. high, exuding a blood-red resin ; trunk $1\frac{1}{2}$ to 3 ft. in diam. at the base ; crown much dilated, in the form of a parasol, towering over all the other trees of the forest ; when in flower it is always frequented by dense swarms of bees, and the negroes prefer to fasten their hives to the lower branches of the crown of this tree ; wood apparently strong and durable ; petiolules tumid, not rarely thicker than the petiole, rather downy ; panicles divaricately branched, broadly pyramidal ; pod obliquely ovate, a little curved, apiculate, glabrous on both sides, with raised reticulation in the centre. Native name "Mulumba." Abundant in the woods of the district, and still commoner in the Songo district and on the left bank of the river Cuanza and in the Haco country and in that of the Quibundos. From Sansamanda to Quisonde ; fl. March, fr. May 1857. No. **1865**.

2. **P. tinctorius** Welw. Apont. p. 584, n. 7 (1859) ; Baker, *l.c.*, p. 239 ; Ficalho, *l.c.*, p. 146 (1884).

Pterocarpus (sp.), Welw. Synopse, p. 8, nn. 5, 7 ; p. 9, n. 15 ; p. 33, nn. 85, 86 (1862). *Lingoum tinctorium* O. Kuntze, *l.c.*, p. 193.

Libongo.—A handsome tree with the habit of *Ceratonia Siliqua* L. ;

wood valuable, blood-red, producing a red dye; leaves evergreen; flowers pleasantly fragrant, paniculate, orange-yellow; pods 1-seeded, very broadly winged. In mountainous forests, especially on slopes near the banks of the river Lifune; with well-developed fr. in Sept. 1858. Name "Tacula." No. **1870**. Coll. Carp. 438.

Zenza do Golungo.—An immense tree; wood blood-red, that of the root more deeply coloured; called by the native negroes "Lucula," and by the Portuguese colonists "Tacûla." Sporadic, in open rocky woods between the village of Calumguembo and Tanderachique; with ripe fr. at the end of Sept. 1854. No. **1866**. About 90 ft. high; crown broad and densely leafy; branches spreading, the lower ones extending to a great distance, sub-pendulous. Between Calumguembo and Calolo; fr. Sept. 1854. Native name "Tacula" or "Hula." Coll. Carp. 437.

Lichen n. 415 grew on the trunk of this tree. It is said that here the wood is more compact and the red dye faster than in the mountainous districts. The dust from the pounded root is always preferred to that from the trunk, as it contains a higher proportion of colouring matter.

Golungo Alto.—A large handsome tree; crown very broad: branches patent; branchlets almost nodding; wood of a fine blood-red colour, rather hard, medicinal; flowers dull saffron-yellow, already caducous when scarcely open, sometimes nearly precocious in the absence of the foliage, at other times in company with the developed leaves; standard orbicular-obcordate, finely crisp, of a deep yellow almost saffron colour; petals of the keel also of a deep dull yellow colour, free at the base, slightly cohering in the middle; lamina as well as the claw sinuous-dentate; stamens 10, of unequal height, monadelphous; tube of the filaments ample, open on the keel side; anthers deep-yellow; ovary shortly stipitate, pubescent, gradually narrowing into the style, gibbous on one side; fruit in the form of a disk, being a pod almost spirally twisted and girt by a very broad hard-chartaceous margin which becomes woody when old; seed solitary. Frequent in primitive forests throughout the district; at the village in leaf without fl. or fr. beginning of Sept. 1855; near the village of Loango (negro name "Mubiri"), Sobato de Mussengue, without fl. Nov. 1855; fl. 19 March 1856; near Cabanga-Caculungo, in good fl. middle of April 1856. No. **1867**. Fungus n. 353 grew on this tree. A vast tree, 30 to 70 ft. high; primary trunk 2 to 5 ft. in diam. at the base, straight. crown ample, beautifully frondose; wood blood-red, with blackish veins, much valued for joiners' work; leaves evergreen, 3-5-jugate; leaflets alternate, coriaceous, glossy above; petiole articulated at the tumid base; panicles of the orange-coloured flowers from the axils of the uppermost leaves; peduncles as well as their ramifications the pedicels and the calyces covered with short velvety blackish tomentum; calyx tubular-campanulate, a little curved, unequally toothed; standard obovate-spathulate, of a deep orange colour, inside from the base to the middle red-spotted-striate; lamina transversely rugose-crisp; claw channelled; wings lanceolate-spathulate, orange-coloured, with long lateral arched claws and crisp lamina; petals of the keel free at the base, coalescent at the apex, shorter paler and less crisp than the wings; stamens 10, monadelphous, 5 higher than the rest; all fertile and shorter than the petals; ovary 1- very rarely 2-ovuled. Frequent in the primitive forests from Calôlo to Trombeta, Ithamba, etc., up to Sange; fl. Jan. 1857. Bango name "Lucula," Sange name "Hûla," colonial name "Tacula." No. **1867***b*.

Pungo Andongo.—A tree of moderate size; leaflets coriaceous, glossy, rather hard; flowers strongly smelling, of a dull saffron-yellow

colour; wood in some cases blood-red, in others whitish. Sporadic, in the secondary woods of Sobato Cabanga Quiquette; fl. middle of Jan. 1857. Called by the negroes "Muangue." No. **1871**. A tree, 20 or about 35 ft. high; crown ample, lax; fruit fuscous-velvety on both sides, wavy on the margin; style-bearing extremity drawn far downwards. In the sandy mixed forest from Lombe in the direction of Quibinda, where only one tree with a few fruits was seen March 1857. No. **1872**. Further in the interior, fr. COLL. CARP. 439.

The pounded root of this plant furnishes the drug in most general use among the natives of Angola and reputed as the principal panacea for the cure of illness; mixed with various vegetable and mineral substances, the sawdust of Tacula is used in the composition of charms and for decoration of the body; newly born children are frequently painted as soon as possible all over with the red dye made from this powder, and stylish ladies on festive occasions never appear without having their feet coloured with this dye, so as to imitate shoes or slippers; it is sold in all the markets, and all the native tribes believe in its remarkable virtues. The tree is rare in the coast region, and there it appears only as a stumpy tree, commencing at the higher part near Calumguembo, becoming more abundant above Dande and Dembos towards Sange, and being lost sight of about Pungo Andongo where *P. mellifer* Welw. and *P. erinaceus* Poir. make their appearance.

Var. *β.* **macrophyllus** Welw. ex Baker, *l.c.*

GOLUNGO ALTO.—A lofty tree; wood valuable, of a fine purple colour when old; the natives paint their bodies red by means of a decoction of the wood. In the dense primitive forests at the base of the mountains of Serra de Alto Queta; in late fl. Feb. 1855. Native name "Tacûla." No. **1868**.

CAZENGO.—In the elevated coffee forests of Serra de Muxaûlo, near the summit; sparingly in fl. at the beginning of Jan. 1855. A form with elongated leaflets. No. **1869**.

3. **P. erinaceus** Poir. (*erinacea*) in Lam. Encycl. Méth. v. p. 728 (1804), Illustr. t. 602, f. 4; Baker, *l.c.*, p. 239; Ficalho, Pl. Uteis, p. 147.

Pterocarpus (sp.) Synopse, p. 37, n. 100. *P. angolensis* DC. Prodr. ii. p. 419 fide Baker, *l.c.*, p. 240. *Echinodiscus* (sp.), Welw. Synopse, p. 19, n. 48. *Lingoum erinaceum* O. Kuntze, Rev. Gen. Pl. i. p. 193 (1891).

PUNGO ANDONGO.—A moderate-sized tree, 20 to 40 ft. high, or sometimes in secondary woods a shrub of 2 to 4 ft. and already in this state flowering and fruiting; branches patent; crown rather lax; resin black-purple. Produces gum kino. Wood durable, red-resinous; leaves coriaceous; pod circular, broadly winged, rigidly echinate in the centre. Very plentiful in sandy and rocky woods throughout the district, especially from Zamba up to the fortress of Pungo Andongo, sometimes constituting the bulk of the forest; near Cazella, in young fr. Oct. 1856. At the banks of the river Lutete in Mata de Pungo, in company with *Psoralea andongensis* Welw. Native name "Ngillasonde" or "Mutete." No. **1864**.

HUILLA.—A robust tree, 15 to 25 ft. high, evergreen, with dilated crown and patent branches, exuding a blood-red resin called gum kino. In the less dense woods around Lopollo, Nene, Humpata, Monino, etc.; fr. Feb. and March 1860. No. **1863**. Resin called "Sangue do Drago," red or atro-purpureous. Lopollo, March 1860.

Coll. Carp. 440. Called "Mirahondi" or "Munhaneca"; the resin is sold under the name of "Sangue do Drago." Coll. Carp. 441.

The trunk does not usually exceed 18 in. in diam.; its wood is compact, heavy, strong, of a moderately fine grain of a dark purple colour, taking easily a good polish, and consequently well adapted for various domestic uses, for agricultural implements, and for weapons, among which must be principally mentioned the war-clubs of the natives which are most frequently made of the heart of this wood; the resin, which drops in abundance from incisions made in the trunk, is of a blood-red colour with a peculiar lustre, and is employed by the natives in the treatment of wounds. Coll. Carp. 442 is the fruit of *Pterocarpus rufescens* Benth., a lofty tree from the Isthmus of Panama; it was obtained for comparison with the Angolan specimen.

52. **OSTRYOCARPUS** Hook. f.; Benth. & Hook. f. Gen. Pl. i. p. 548.

1. **O.? Welwitschii** Baker in Oliv. Fl. Trop. Afr. ii. p. 240.

Golungo Alto.—A stout shrub, climbing far and wide; trunk slender, arborescent, ½ to ⅔ in. in diam., when old rather flattened but not quite like that of *Amerimnon hostile* O. K., (Herb. No. 1880), with stellately arranged spines in the middle; wood very hard and tenacious, flexible, dense, firm, yellowish. Used for drum-hoops. Branches erect-spreading, as well as the branchlets at length pendulous; some of the branchlets reduced by abortion to short blunt spines; leaves deciduous, impari-pinnate; leaflets 10-15-jugate, opposite, especially beneath glaucous, herbaceous or thinly fleshy-coriaceous, deciduous at the flowering season; petioles pyriform-globose at the base, lasting for a time on the flowering branches; flowers pedicelled, collected in rather lax and erect racemes, finely variegated with sulphur colour and red; calyx bilabiately campanulate, beset with stalked glands, densely hairy inside, bright-red at the base, yellowish-green on the limb; vexillary limb rather the longer, broad, emarginate, obtuse; the lower lip deeply 3-lobed with acuminate lobes; corolla papilionaceous; petals of bright sulphur colour, red-spotted or punctate at the base of the lamina with long and slender claws; standard orbicular, slightly emarginate, together with the channelled claw acutely keeled on the back, at the time of flowering reflexed on the sides, as long as or hardly shorter than the wings; wings oblong, with a long one-sided stipes, not adhering to the keel; petals of the keel similar to the wings in shape, as short or shorter, unguiculate, loosely cohering below the apex of the lamina; stamens sometimes only 9, diadelphous, of unequal length; vexillary filament shorter than the rest, free, somewhat curved at the base; the remaining filaments united two-thirds way up into a tube open in front, flattened on the free part, a little longer than the ovary; anthers versatile, ovate and obtuse, others rarely acuminate by the production of the connective at the apex beyond the cells, one sometimes petaloid with a small falciform lamina; the base not uncommonly bearing another sub-effete anther; ovary sessile, lanceolate, pilose, with a fissure or easily parting on one side: ovules usually 5, nearly orbicular; style but little incurved, smooth, filiform, of equal thickness up to the stigma which is truncate-capitate and a little thicker. In dense primitive thickets, in the ascent to Sobato de Bumba; fl. 7 July 1856. Near the cataracts of the river Cuango; not in fl. beginning of August 1855. No. **1884.**

The Cabindas make walking-sticks from this plant. In the absence of the pod, the final determination of the genus of this plant remains uncertain.

53. **LONCHOCARPUS** H. B. & K.; Benth. & Hook. f. Gen. Pl. i. p. 548.

1. **L. macrophyllus** H. B. et Kunth, Nov. Gen. et Sp. vi. p. 384 (1823).

L. sericeus H. B. et Kunth ex DC. Prodr. ii. p. 260 (1825); Baker in Oliv. Fl. Trop. Afr. ii. p. 241; Ficalho, Pl. Uteis, p. 148 (1884). *L. formosianus* DC., *l.c.*, p. 260. *Milletia* (sp.), Welw. Apont. p. 573, sub n. 174. *M. speciosa*, Welw. Apont. p. 585, n. 23; Welw. Synopse, p. 13, n. 29 (1862).

Ambriz.—An immense tree, 50 ft. high or more or in secondary thickets 25 to 30 ft.; crown dilated, densely leafy; flowers handsome, of a violet-rose colour, lasting a long time. In the more open woods about Banza de Ambriz, and at the banks of the river Quizembo to the north of the citadel of Ambriz, four miles from the ocean. In fl. at the end of Nov. 1853. Native name "Mutala-Menha." No. **1840**.

Barra do Bengo.—A much-branched tree, 20 to 40 ft. high, with a broad crown; branches very patent, elongated, sometimes almost nodding; flowers racemose-paniculate, very beautiful, of a deep violet colour; standard silvery-silky outside. At the banks of the river Bengo or Zenza, near the village of Quifandongo; in fl. (flowering specimens immersed in the river and afterwards recovered), Dec. 1853 and Jan. 1854; fr. Sept. 1857. No. **1842**. Native name "Mutala-Menha." Coll. Carp. 443.

Icolo e Bengo.—A tree, 15 ft. high, with an ample crown; without fl. or fr. Sept. 1857, near Foto, differing from the common form by acuminate leaflets. No. **1842***b*.

Cazengo.—A copiously-flowering evergreen tree, 20 to 40 ft. high or more, sometimes a vast majestic tree of 60 to 100 ft., a beautiful ornament to the forests alongside the river Luinha; timber valuable for the construction of domestic and agricultural implements, very strong and tenacious; pods indehiscent, when fully ripe separating into joints, but never seen by Welwitsch to dehisce. Native names "Mutala-Menha" and "Seca-seca." Abundant at the banks of the river Luinha, also in the comparatively dry mixed woods from Cambondo in the direction of Aguas doces, etc.; fl. end of Dec. 1854, fr. June 1855. No. **1843**. This is probably the plant from the district of Cazengo referred to under the name of "Caseque" by Welwitsch, Synopse, p. 9, n. 16 (1862).

Golungo Alto and Dande.—Fruits; Trombeta, 28 August 1857; Bombo (Dande), Sept. 1858; native name "Mutala-Menha." Coll. Carp. 156.

Island of St. Thomas.—A tree of moderate size. In the elevated forests of Monte Caffé, between 1800 and 2000 ft. above the sea-level; fr. Dec. 1860. No. **1841**.

The following No. should be compared with this species:—

Sierra Leone.—A tree about 25 ft. high, with a broad crown and habit nearly of the walnut; leaflets 7 or 9, coriaceous, glabrous on both surfaces, $5\frac{1}{2}$ by $2\frac{1}{2}$ in.; flowers lilac; standard silvery-silky outside. Among the mountains near Freetown; fl. and fr. Sept. 1853. No. **1839**.

2. **L. Capassa** Rolfe in Oates, Matabele Land, edit. 2, p. 397 (1889).

Capassa violacea Klotzsch in Peters, Mossamb. Bot. i. p. 28, t. 5 (1862). *L. Philenoptera* Harv. in Harv. & Sond. Fl. Cap. ii. p. 263 (1861-62); non Benth. *L. violaceus* Oliv. in Trans. Linn. Soc. xxix. p. 63 (1872); non H. B. & K. *L. loxiflorus*, var. *sericeus* Baker, l.c., p. 242.

Huilla.—A stout shrub, perhaps the upgrowth from the stump of a mutilated or burnt tree. At Ferrão da Sola; in young fr., without either leaves or flowers, in April 1860. No. **1879**. Leafy branches collected from a neighbouring shrub of the same habit and ramification, but scarcely seeming to belong here; leaves usually trifoliolate, more rarely pinnate and bijugate; branchlets purplish, longitudinally sulcate. At Ferrão da Sola, in leaf, without either fl. or fr., in April 1860. No. **1879***b*.

3. **L. pallescens** Welw. ex Baker, *l.c.*, p. 242.

Zenza do Golungo.—A tree, 25 to 40 ft. high or more, with the habit of an Ash, with an interrupted crown; trunk 8 to 24 in. in diam.; branches patent; leaves impari-pinnate, deciduous at the time of flowering; leaflets herbaceous; flowers of a sordid-violet colour. Abundant, but apparently limited to this region, along the sides of the stream Calucala, in rocky places; fl. and fr. as well as specimens in leaf Sept. 1857. No. **1847**.

There is some doubt whether the specimens bearing foliage belong to the same species, but they apparently do so. This is probably the plant from the district of Zenza do Golungo, referred to under the name of "Caseque" by Welwitsch, Synopse, p. 9, n. 16 (1862), and it bears a superficial resemblance to *Platysepalum violaceum* Welw. Herb. No. 1838.

54. **DEGUELIA** Aubl. Hist. Pl. Guian. p. 750, t. 300 (1775). *Derris* Lour. (1790); Benth. & Hook. f. Gen. Pl. i. p. 549.

1. **D. ? glabrata** Taub. in Bot. Centralbl. xlvii. p. 387 (1891).

Derris ? glabrata Welw. ex Baker in Cliv. Fl. Trop. Afr. ii. p. 244. *Pterocarpus glabratus* O. Kuntze, Rev. Gen. Pl. i. p. 203 (1891).

Golungo Alto.—An erect shrub, 3 to 5 ft. high, perhaps subsequently scandent; leaves impari-pinnate; leaflets 5 to 7, opposite, very obtuse or emarginate, shortly pubescent not tomentose beneath; flowers whitish, $\frac{1}{3}$ in. long (in the dry state), crowded; calyx loosely tomentose. In moist thickets near Undelle; fl. March 1855. No. **1888**.

2. **D. lucida** Taub. in Bot. Centralbl. xlvii. p. 387 (1891).

Derris lucida Welw. ex Baker, *l.c.*, p. 245. *Pterocarpus lucidus* O. Kuntze, Rev. Gen. Pl. i. p. 203 (1891).

Golungo Alto.—A stout evergreen shrub climbing up to 30 ft. and higher; leaflets opposite, hard-coriaceous, remarkably glossy above, without stipellæ; bracts small, lanceolate, as also the two very small bracteoles ciliate at the base and very caducous; calyx 5-dentate; the upper teeth connate, higher than the lower; standard greenish-white, ovate, with a channelled claw, exappendiculate; wings white, narrowly oblong, rather longer than the standard, with an obtuse auricle; keel whitish-purple or pale-rose, a little curved, rather obtuse, the petals cohering at the top of the back; vexillary stamen quite free; ovary sessile, compressed, rather hairy, 3-5-ovuled; style purple, compressed, rather broad, rather hairy, naked and almost subulate a little below the small stigma; disc surrounding the ovary, cupuliform, 10-crenate, adnate to the staminal sheath for half its own height, free above; pod (immature) broadly elliptical oval or oblong, $2\frac{1}{4}$ to $2\frac{3}{4}$ in. long by $\frac{3}{4}$ to $1\frac{1}{4}$ in. broad, girt with a short wing on each suture. Sporadic, in the primitive forests of Sobato de Quilongo-Quiacatubia, at an elevation of 2400 ft.; fl. and young fr. July 1856. No. **1877**. A robust shrub, climbing to a great height; stem 3 to 4 in. in diam.

at the base ; leaflets coriaceous, glossy, evergreen ; flowers white. In the primitive forests of the mountains of Serra de Alto Queta ; fl. beginning of June 1856. No. **1878**.

3. **D. nobilis** Taub. in Bot. Centralbl. xlvii. p. 387 (1891).

Derris nobilis Welw. ex Baker, *l.c.*, p. 245. *Pterocarpus nobilis* O. Kuntze, *l.c.*, p. 203.

Golungo Alto.—An ample shrub, climbing to a considerable height, 25 ft. long in one case, rusty-tomentose generally except the older stems and the petals ; the ultimate branchlets twining ; adult leaves 18 in. long, impari-pinnate ; leaflets 7 or 9 rarely 3, stipellate, ranging up to 7 by 3 in., ovate-olong or elongate-obovate or -lanceolate, rounded and more or less emarginate at the base, glabrescent and glossy above, densely tomentose beneath ; flowers whitish, nearly $\frac{1}{2}$ in. long (in the dry state) ; bracteoles small, ovate-orbicular, ciliate, appressed to the distinctly 4-toothed calyx ; standard obovate-oblong, cymbiform-concave, not reflexed, somewhat hooded at the vertex, shortly auriculate on both sides, subtending the larger calyx-tooth ; wings shorter than the standard and keel, narrowly oblong, adhering to the keel above the claw, furnished with a long subsulcate acuminate appendix ; keel nearly straight, its petals obovate, slightly cohering at the back, appendaged with a short triangular auricle ; vexillary stamen free at the base, connate in the middle with the rest in a tube ; anthers uniform, versatile ; ovary substipitate, elongated, pilose, gradually passing into the incurved style ; stigma rather small, terminal ; ovules few. In the primitive forests of the mountains of Serra de Alto Queta ; fl. August and Sept. 1856. At Zenzas do Queta, in flower-bud, lasting in this condition during three months, June 1856. No. **1890**. An erect shrub, 3 to 5 ft. high, often with large leaves, but rarely flowering ; branches few, rather patent. In moist spots on the exposed stony slopes of the mountains of Serra de Alto Queta facing towards the river Luinha ; without fl. August 1856. No. **1890***b*.

Pungo Andongo.—A shrub climbing to a great height or decumbent over rocks and covering them over an extensive surface ; leaves impari-pinnate, coriaceous ; flowers white. In rocky places, at the skirts of Mata do Pungo within the lines of fortification in company with *Hugonia Afzelii* Br., var. *melanocalyx* Welw. (Herb. No. 1586) ; fr. Dec. 1856. No. **1891**.

4. **D. brachyptera** Taub. in Bot. Centralbl. xlvii. p. 386 (1891).

Derris brachyptera Baker, *l.c.*, p. 246. *Pterocarpus brachypterus* O. Kuntze, *l.c.*, p. 203.

Golungo Alto.—An arborescent shrub, climbing to the height of 80 ft. (or in secondary thickets a shrub as tall as a man), obscuring by the panicles of its whitish flowers the tree on which it grows ; leaves impari-pinnate ; leaflets 3 to 7, opposite, tomentose beneath, ranging up to 10 by $6\frac{1}{2}$ in., truncate or emarginate or sub-bilobed at the apex, stipellate ; flowers $\frac{1}{2}$ in. long or more (in the dry state) ; calyx puberulous ; standard a little shorter than the keel, densely bearded-ciliate at the apex, cymbiform. In the dense forests of Cungulungulo in brilliant fl. and young fr. Feb. 1855. No. **1889**. A low shrub, always barren when seen, perhaps young ; in secondary thickets between Sange and Bango ; without fl. Nov. and Dec. 1854. No. **1889***b*.

The following three Nos. appear to belong to *Deguelia* or to a genus of the same tribe ; but the pods of the first No. seem to be dehiscent :—

Golungo Alto.—A vast tree, 50 to 100 ft. high; trunk 2 to 3½ ft. in diam. at the base, in old trees naked for a great height; timber very hard: branches patent; crown broad, dense, depresso-ovoid; branchlets densely ferruginous-tomentose; adult leaves a yard long or more, impari-pinnate; petiole articulate at the base, ventricose, bistipulate: stipules broad, coriaceous, concave, hooded; leaflets alternate, 11 to 15, softly coriaceous, oval, obtuse or cuspidate at the apex, more or less cordate at the base, 2 to 7 by 1¼ to 3 in., pellucid-venulose, glossy above, with raised nerves and with dense raised intervening veinlets beneath, densely hispid-pilose beneath (on old trees ferruginous-tomentose); petiolules thickened, uni-stipellate; pods apparently dehiscent, 5 to 7 by 1½ to 1¾ in., 1-seeded; seed rather compressed, 1 by ½ in. Sporadic, at the margins of primitive forests between Sange and Bango-Aquitamba: in flower-bud with foliage 8 Sept. 1856; flowers not seen in Oct. and Nov.; in fr. after the fall of the leaves in July 1857. No. **1892**. The apex of a tree 7 ft. high, according to Dr. Welwitsch apparently a young plant of No. 1892; leaflets 9, oval or ovate, cuspidate at apex, cordate at base, paler beneath, 2¼ to 3¾ by 1⅖ to 2 in., the lateral ones sub-opposite; in the dense primitive woods between Sange and Bango-Aquitamba, during an excursion started from Capopa, with foliage without fl. or fr., in July 1857. No. **1893**. Fresh shoots of a tree a foot in diam. at the base, which had been cut down; leaflets 13 to 15, alternate or sub-opposite, oval or oblong, obtuse or sub-cuspidate at the apex, somewhat cordate at the base, 4 to 7 by 2 to 3¼ in., paler beneath: in the forest in front of Quibixe, in leaf, without fl. or fr. in August 1855. No. **6678**.

55. **DALHOUSIEA** Graham; Benth. & Hook. f. Gen. Pl. i. p. 552.

1. **D. africana** S. Moore in Journ. Bot. 1880, p. 2.
D. bracteata Baker in Oliv. Fl. Trop. Afr. ii. p. 247.

Golungo Alto.—A small tree or sometimes (in secondary thickets) a robust tree-shaped shrub, 8 to 10 ft. high; branches climbing far and widely, sarmentose or sub-sarmentose, nodulose; leaves simple (uni-foliolate), rigidly papery or coriaceous, dark-green, pendulous; calyx sub-campanulate, almost corolline, after flowering saucer-shaped, with the margins bent inwards, shortly 5-toothed, included in 2 orbicular ciliate green bracteoles; corolla snow-white, much longer than the calyx; standard very broadly obcordate; wing-petals obovate-oblong, patent; keel falcate; stamens free; anthers yellow; ovary lanceolate; slightly crenate, quite glabrous, rather compressed, gradually tapering into the cylindrical style which rather exceeds the stamens; stigma narrowly capitate; pod few-seeded, bivalved, dehiscent; valves hard, black, glaucous. At the margins of primitive forests along the banks of the river Delamboa and in secondary thickets near Undelle, Bango, and in Serra de Alto Queta; not uncommon but in fr. rather rare; fl. May, Oct. and Dec. 1855 and in May and June 1856; fr. in March and April 1856; at elevation of 2400 ft. No. **2236**. Coll. Carp. 448. A shrub with simple coriaceous long-petiolate leaves and white flowers. In dense forests near Sange; fl. Feb. and March, ripe fr. August 1855. Coll. Carp. 449.

This species occurred in the localities mentioned above in company with *Cacoucia platyptera* Welw. Herb. No. 1752; see Welw. Sert. Angol. p. 26 (1869). It occurs also in the Congo district, having been found by Monteiro at Quiballa flowering in the month of April. The fungus n. 387 grew on the branchlets of *Dalhousiea* in the district of Cazengo. It is very nearly related to the North Indian species

D. bracteosa Graham, to which species it has been referred by Baker and others : it however differs by the more ovate and acuminate shape of the leaves, etc.

56. **BAPHIA** Afzel.; Benth. & Hook. f. Gen. Pl. i. p. 553.

1. **B. angolensis** Welw. ex Baker in Oliv. Fl. Trop. Afr. ii. p. 249; Ficalho, Pl. Uteis, p. 149 (1884).

Golungo Alto.—A tree 15 to 20 ft. in the elevated primitive forests, or in the secondary woods a shrub of 6 to 10 ft. ; branches spreading ; branchlets very slender, always more or less nodding ; bark grey, reticulately veined ; leaves rigidly and dryly but thinly coriaceous like parchment, glossy above, a little paler and rather shining beneath ; petiole turgid, cylindrical, transversely wrinkled, shallowly furrowed above ; flowers on slender axillary peduncles arising from the young shoots ; calyx brilliantly white-corolline, spathaceous, supported at the base by two spreading bracteoles, at length cleft down the front and reclining with induplicate margins when the standard becomes erect ; standard ample, orbicular, emarginate at the apex, erect, not unguiculate, brilliantly white, but ornamented with an orange spot in the middle and towards the base ; wings patent, obliquely obovate, whitish ; keel boat-shaped ; seeds ellipsoidal, compressed, half an inch long. In the elevated mountainous forests of Sobato de Bumba, Queta, and Mussengue, not common ; fl. Nov. 1855 and March 1856 ; behind Rodrigo's house, above the waterfall ; fr. Feb. 1856. No. **601**. Sange ; fr. June 1856. Coll. Carp. 450.

57. **GIGANTHEMUM** Welw. Apont. p. 585, n. 14 (1859). *Camoënsia* Welw. (1865); Benth. & Hook. f. Gen. Pl. i. p. 557.

1. **G. scandens** Welw. Apont. p. 585, n. 14.

Camoënsia maxima Welw. ex Benth. in Trans. Linn. Soc. xxv. p. 301, t. 36 (1865); Baker in Oliv. Fl. Trop. Afr. ii. p. 252; Monteiro, Angola, i. p. 177, t. 6 (1875).

Golungo Alto.—A robust shrub, climbing to a great height and then hanging down its graceful branches, constituting the highest ornament amongst the climbing shrubs of this region ; flowers very large, the largest among Angolan Leguminosæ, emitting a peculiar odour, almost spermatic ; calyx-tube long, cleft at the apex in a bilabiate manner ; upper lip shortly bifid, with oblique ovate obtuse diverging teeth ; lower lip deeply trifid, with equal lanceolate teeth shortly acuminate at the apex ; petals 5, white, marcescent, inserted on the calyx-tube, very wavy at the margin, crisply fringed ; fringe of a fine orange colour ; standard broadly spathulate, radiately striate, channelled at the claw, at the time of flowering longitudinally folded ; the other four petals similar, narrowly spathulate and a quarter the width, long-clawed, with an orange-coloured fringe ; stamens marcescent, monadelphous below, free for a long distance ; anthers linear, attached at the middle of the back, 2-celled, longitudinally dehiscing, exserted ; ovary densely fuscous-tomentose, long-stipitate ; style very long, incurved, whitish-green ; stigma capitate, deep-green, viscid, glossy ; pod lanceolate-spathulate, compressed, subcoriaceous, densely ferruginous-tomentose, broader near the apiculate apex, 6 to 7 in. long, 1 to 1½ in. broad ; seeds 2 to 5, oblong, compressed, brown, shining, about an inch long. At the margins of forests, climbing high upon the neighbouring trees, between Sange and Cambondo ; fl. and fr. Dec. 1854.

In the lofty forests by the Delamboa stream, end of August 1855. Abundant in the denser forests and at their margins, elegantly decking the tallest trees; fl. 6 Jan., fr. Feb. 1856. No. **550**. (Seeds more than an inch long.) In the forests of Mata de Queta; fr. July 1857. Coll. Carp. 451. Undelle; fr. June 1855. Coll. Carp. 462.

It was found growing in company with *Cacoucia platyptera* Welw. Herb. No. 1752, in Serra de Alto Queta at an elevation of 2000 to 2300 ft. (See Welw. Sert. Angol., p. 26.) The time of flowering is from Dec. to March; the fruits are ripe from May to August.

58. **CALPURNIA** E. Meyer; Benth. & Hook. f. Gen. Pl. i. p. 554.

1. **C. lasiogyne** E. Mey. Comment. Pl. Afr. Austr. Dreg. p. 3 (1836). *C. aurea* Baker in Oliv. Fl. Trop. Afr. ii. p. 252.

Golungo Alto.—A shrub of 4 to 6 ft., perhaps the upgrowth from a tree burnt down; leaves glaucous-green; pods compressed, 8-10-seeded, winged at the back, on rather a long stipes. In the rather elevated forests of Mata de Quisuculo, near Bango Aquitamba; at an elevation of 2400 ft.; in young fr. Jan. 1856. No. **2233**.

Bumbo.—A shrub, with numerous stems and the habit of a *Colutea*, 5 to 7 ft. high; on the shrubby slopes of Serra da Xella, between Bruco and Chão da Xella, at an elevation of about 2500 ft.; fl. and ripe fr. Oct. 1859. No. **2234**.

Huilla.—Petioles constantly pubescent or even shaggy, not glabrescent as in Natal specimens; calyx-teeth sometimes all nearly equal, sometimes the two upper ones more highly connate. In the more elevated forests of Serra da Xella at 4000 ft. alt., and about Lopollo at about 5200 ft. alt.; fl. Oct. and Nov. 1859, fr. Nov. and Dec. 1859. No. **2235**. An arborescent shrub, standing erect, 5 to 7 or even 10 ft. high, with the habit almost of a *Colutea*; stems numerous; flowers racemose, handsome, yellow. In the mountainous thickets of Lopollo; fr. 1 Nov. 1859. Coll. Carp. 38.

59. **ORMOSIA** G. Jacks.; Benth. & Hook. f. Gen. Pl. i. p. 556.

1. **O. angolensis** Baker in Oliv. Fl. Trop. Afr. ii. p. 255.

Huilla.—A small tree of 8 ft., or perhaps a young state of a larger tree; flowers dusky-red. Calyx campanulate, 5-cleft, the two upper teeth partly connate; petals 5; standard obovate, broad, subemarginate, with a short claw; the other petals all clawed and obtusely lobed alongside the claw; stamens free, 4 or more of them fertile; anthers versatile; style curved; stigma narrowly capitate; ovules few. In bushy stony places between Mumpulla and Humpata, rather rare, only one plant seen in flower, in Oct. 1859. No. **615**.

60. **TOUNATEA** Aubl. Hist. Pl. Guian. i. p. 549, t. 218 (1775). *Swartzia* Schreb. (1789); Benth. & Hook. f. Gen. Pl. i. p. 561.

1. **T. madagascariensis** Taub. in Bot. Centralbl. xlvii. p. 391 (1891). *Swartzia madagascariensis* Desv. in Ann. Sc. Nat., ser. i., vol. ix. p. 424 (1826); Baker in Oliv. Fl. Trop. Afr. ii. p. 257; Ficalho, Pl. Uteis, p. 150 (1884). *Cassia* (sp.) Welw. Apont. p. 591 (n. 97).

Pungo Andongo.—A tree, 15 to 20 ft. high; trunk 8 to 9 in. in diam. at the base; branches spreading; branchlets horizontal or even nodding; bark whitish; leaflets dryly coriaceous, with (according to Welwitsch's mss.) pellucid veinlets, scarcely shining; legumes pendulous, cylindric-vermicular, more or less torulose, rather flexuous,

stipitate, many-seeded ; sarcocarp thick, resinous-fleshy ; seeds excentrically umbilicate, intercepted with apparently spongy constrictions. Rather rare in open woods at the base of the gigantic rocks of the fortress, near Luxillo, in young fr. middle of Dec. 1856. Native name "Mucombé." No. **587**. Tree 10 to 15 ft. high ; leaves pinnate, glaucescent. In wooded places by the river Cuanza, near Sansamanda ; fr. April 1857. COLL. CARP. 482.

HUILLA.—Ripe seeds at Monino in Dec. 1859. No. **587***b*. A small tree of 7 to 10 ft. or perhaps a young tree, with loose and rambling branches, quite simulating the habit of a *Cassia* ; flowers whitish. In open sandy woods mixed with species of *Protea*, *Eugenia*, and Combretaceæ, between Lopollo and Monino, at an elevation of 5000 feet ; in. fl. Nov. 1859 and in the same spot in young fr. Feb. 1860, fr. May 1860. A form with young parts, etc., clothed with a soft ferruginous tomentum. No. **586**.

2. SUB-ORDER CÆSALPINIEÆ.

61. **PELTOPHORUM** Vogel ; Benth. & Hook. f. Gen. Pl. i. p. 565.

1. **P. africanum** Sond. in Linnæa xxiii. p. 35 (1850) ; Oliv. Fl. Trop. Afr. ii. p. 260.

Brasilettia africana O. Kuntze, Rev. Gen. Pl. i. p. 164 (1891).

HUILLA.—A handsome tree, 20 to 30 ft. high, or, in the secondary woods, 10 to 12 ft. high, with the habit of Mimoseæ ; trunk with rambling and spreading branches, and with a broad crown ; leaves without spines ; flowers saffron-yellow, handsome ; pedicels with two caducous bracts at the base ; style curved inwards ; stigma broadly peltate, sub-lobed ; pod foliaceous, indehiscent, usually 2-seeded, much compressed, lanceolate on both sides, but especially along the seed-bearing suture surrounded by an acute wing. Frequent in nearly all the woods of the plateau of Huilla, along the banks of rivers ; Lopollo : fl. and young fr. Oct. 1859, in ripe fr. with seeds beginning of May 1860. No. **603**. A tree of 20 to 25 ft., especially recommended for cultivation ; flowers paniculate. Abundant, and in company with species of *Protea* and Combretaceæ ; fl. from Oct. to Jan. Lopollo, Jan. 1860 and 24 May 1860 ; fr. COLL. CARP. 41.

BUMBO.—A tree, 20 to 30 ft. high, with rather lax crown and spreading branches ; flowers saffron yellow. Common in the midst of the mountains of Serra da Xella ; fl. Oct. 1859. No. **603***b*.

MOSSAMEDES.—A tree, 20 ft. high, at times taller ; crown handsome, ovoid-hemispherical, densely frondose ; leaves bipinnate ; pods racemose, shortly pedicellate, narrowly elliptical, narrowed at both ends, turning woody, 1- or rarely 2-seeded. In thickets of *Tamarix orientalis* Forsk. (Welw. No. 1086), at the sides of the river Bero, near the copper mine ; fr. July 1859. No. **604**.

62. **MEZONEURUM** Desf. ; Benth. & Hook. f. Gen. Pl. i. p. 565.

1. **M. angolense** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 261 ; Ficalho, Pl. Uteis, p. 150.

GOLUNGO ALTO.—A robust, very prickly shrub, decumbent or scandent ; sarmentose branches 10 to 15 ft. long ; flowers handsome, yellow or yellow-orange. In stony thickets at the margins of forests, between Sange and Camilungo, by the Ambaca road ; fl. Feb. 1855, ripe fr. Oct. 1855. No. **607**. Climbing far and widely ; fr. Oct. 1855, and sparingly in July 1856. Native name "Saje." COLL. CARP. 131.

Ambaca.—A robust shrub ; sarmentose branches very long, running along the ground, then ascending. By the high road, near Ambaca; fr. Sept. 1856. No. 606*b*.

Pungo Andongo.—An arborescent shrub, with long-sarmentose and spiny branches, and deep-yellow flowers. Rather rare, in the rocky parts of the fortified district of Pungo Andongo ; fl. April 1857. Native name "Sage." No. 606.

2. **M. Welwitschianum** Oliv. Fl. Trop. Afr. ii. p. 261.

Golungo Alto.—A widely climbing shrub ; branches and petioles beset with bent-back prickles ; leaves abruptly bipinnate, glaucescent ; flowers fragrant, like those of *Robinia PseudoAcacia* L. ; calyx-tube short, urceolate-cymbiform, that is, protracted on one side ; limb 5-partite, deciduous ; lobes green outside, yellowish inside, in front arched, at the base reddish, bright blood-red inside ; petals 5, pale-yellow, blood-red-scarlet at the claws inside, the posterior one with the margins folded forwards, and with two scarlet horns ; stamens 10, declinate, all fertile ; filaments gradually subulate from a broad base, densely woolly below the middle, nearly free ; ovary sessile, rather compressed, bearded with white hairs, of a deep blood-red colour, much inclined forwards, gradually tapering into the cylindrical red style, yellow towards the apex ; stigma truncate, scarcely thicker than the style, densely and delicately papillose. Rather rare, in the bushy wooded slopes of Sobato de Mussengue, climbing on "Molálu" (*Vernonia senegalensis* Less.) ; fl. end of Oct. 1855. Native name "Ságe" or "Sasche," pronounced Zasha. The seeds are used in a game called "Sasse." No. 608.

Pungo Andongo.—A robust shrub, widely scandent, with oblique long sarmentose branches. In rocky places in Barrancos da Pedra ; ripe fr. March and April 1857. No. 609. Flowers yellow. Barrancos de Songue ; fr. March and April 1857. Coll. Carp. 470.

The following No. is perhaps a glabrate state or form of this species :—

Pungo Andongo.—A diffusely branched shrub of 4 ft., or perhaps the fresh shoot of a mutilated tree. At the borders of the forest, Mata de Mangue, between Pungo Andongo and Cadumba ; without fl. or fr. Jan. 1857. No. 1808.

63. **CÆSALPINIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 565.

1. **C. pulcherrima** Sw. Obs. Bot. p. 166 (1791) ; Oliv. Fl. Trop. Afr. ii. p. 262 ; Ficalho, Pl. Uteis, p. 151 (1884).

Poinciana pulcherrima L. Sp. Pl. edit. 1, p. 380 (1753). Welw. Apont. p. 574 under n. 175, p. 585, n. 16 ; Welw. Synopse, p. 52 under n. 138 (1862).

Sierra Leone.—Subspontaneous alongside crops in gardens, near Freetown ; fl. and fr. Sept. 1853. No. 595.

Prince's Island.—Sept. 1853 ; fl. No. 596.

Loanda.—Imbondeiro dos Lobos ; fr. August and Sept. 1860. Coll. Carp. 78. Everywhere cultivated in the villages of the negroes for its medicinal virtues ; seeds July 1854. Coll. Carp. 100. Subspontaneous in deserted gardens and around the villages of the negroes ; fl. Jan. 1858 and May 1859. No. 597*a*. Fr. August 1854. Coll. Carp. 471. Spontaneous in thickets near Loanda, and cultivated in gardens ; fr. Dec. 1858. Coll. Carp. 472.

Golungo Alto.—Cultivated and occasionally almost spontaneous in

secondary thickets around Sange; fl. and fr. Feb. 1855 (specimens not found). No. **599**.

Pungo Andongo.—A small tree, 8 to 10 ft. high, with a straight and sometimes bare trunk, and depresso-globose crown; very sparingly or scarcely aculeate. Cultivated and subspontaneous, around the fortress of Pungo Andongo, at Pedras de Guinga; fl. and fr. Dec. 1856 and Jan., Feb., March and May 1857. Native name "Malosa." No. **598**.

Benguella.—Subspontaneous, in bushy places about the dwellings of the colonists and negroes, near the city of Benguella: fl. and fr. June 1859. No. **597***b*.

It is cultivated generally and flourishes well in every province of Angola, becoming at times, as for example in Pungo Andongo, a very bushy little tree, beautifully covered with innumerable flowers of a very brilliant scarlet colour. A decoction of the root is administered by the negro doctors in cases of intermittent fever, and according to them an infusion of the leaves answers the same purpose as the leaves of senna (Welw., *ll. cc.*).

2. **C. Bonducella** Fleming in Asiatic Res. xi. p. 159 (1810); Oliv. Fl. Trop. Afr. ii. p. 262.

Island of St. Thomas.—A robust shrub. Frequent but perhaps formerly introduced: along with crops, by thickets; fl. Dec. 1860. No. **1837**. Only one seed in the study set: seed globose, lead-coloured, like a marble, $\frac{5}{8}$ in. diam. Coll. Carp. 473.

64. **GLEDITSIA** Clayton, L.; Benth. & Hook. f. Gen. Pl. i. p. 568 (*Gleditschia*).

1. **G. africana** Welw. ex Benth. in Trans. Linn. Soc. xxv. p. 304 (1865); Oliv. Fl. Trop. Afr. ii. p. 265 (*Gleditschia*).

Cæsalpiniodes africanum O. Kuntze, Rev. Gen. Pl. i. p. 167 (1891).

Huilla.—A tree, 15 to 25 ft. high, with a diffuse crown; trunk 5 to 6 ft. high; branches patent, thick; flowers whitish-yellow; anthers purple. In open stony woods around Mumpulla at an elevation of 4000 ft.; fr. and sparingly fl. Oct. 1859. No. **591**.

The following No. which has less hairy foliage has been referred to the same species; Welwitsch in his mss. suggests that it may prove to be a different species; it is often confused with *Burkea africana* Hook., var. *andongensis* Oliv., Welw. Herb. No. 574:—

Pungo Andongo.—A tree of middle size with a dilated crown. In the forest near Calundo; fr. June 1857. Native name "Gungo" or "Gungolume." No. **573**.

65. **POINCIANA** L.; Benth. & Hook. f. Gen. Pl. i. p. 569.

1. **P. regia** Boj. ex Hook. Bot. Mag. t. 2884 (1829); Oliv. Fl. Trop. Afr. ii. p. 266, in note; Ficalho, Pl. Uteis, p. 151.

Loanda.—A small very elegant tree, 15 ft. high, with patent subtortuous branches and deciduous leaves. Cultivated in an unfavourable station at Loanda from seeds sent from Mozambique; without fl. or fr. beginning of August 1858; fl. Nov. 1859. No. **600**. Seeds from the Mozambique coast, introduced in 1856, fl. at Loanda in 1861. Coll. Carp. 474.

Seeds from the island of Zanzibar, whence introduced into Mozambique and there it is called "Zanzibar Acacia"; introduced into the Lisbon botanical garden where it flowered, 26 August 1863. Coll. Carp. 524.

66. **CASSIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 571.

1. **C. Sieberiana** DC. Prodr. ii. p. 489 (1825); Oliv. Fl. Trop. Afr. ii. p. 270; Benth. in Trans. Linn. Soc. xxvii. p. 516 (1871); Ficalho, Pl. Uteis, p. 151 (1884).

C. psilocarpa Welw. Apont. p. 587, n. 40.

Pungo Andongo.—A small tree, perhaps a young one, 12 ft. high, branched at the base. Legumes 1 to 2 ft. long, cylindrical, nearly 1 in. thick. Native name of the plant "Mossambe," and of the fruit "Môssue" or "Mósŭa." Employed as a charm, especially in aural diseases. In wooded places near Quitage on the left bank of the river Cuanza, at a spot once much populated but then almost deserted; without fl. March 1857; also forming rather extensive low woods in the same region, April 1857. No. **1740**. An elegant tree of middle height; crown spreading, leafy; pods pendulous, 2 to 3 ft. long when ripe, cylindrical, used by the natives for curing various diseases and as a charm against corpulency. Fr. June 1857. Coll. Carp. 475.

This species is rather rare in Pungo Andongo, but more abundant in the country of the Songo and in that of the eastern Congo; the legumes much resemble those of *C. Fistula* L., although the shape of the seeds is a little different; it is the Cassia fistula of Angola (Cannafistula), and the pods are met with in all the markets of the coast, where the native medical men obtain them, not for the purpose of compounding their physic, but to provide them with an instrument of divination in the detection of the origin of any malady, deed, etc. These impostors employ the utmost skill in artfully examining not only the poor patient but also his relatives and acquaintances, all of whom would be afraid of an accusation or suggestion of being the cause or provoker of the malady. Welwitsch never observed any therapeutical value in this Cannafistula, nor did he discover in it any of the sweet pulp which that of India contains in abundance. (See Welw. Synopse, p. 51 n. 138.)

The following Nos. (1738 and 1738*b*), represented only by foliage, may belong to *C. Sieberiana* DC.; but the leaflets are larger and more acute; they should also be compared with *C. Fistula* L.; the leaflets much resemble those of No. 592, which is doubtfully referred to *Intsia africana* O.K., but they are more numerous (8 pairs):—

Island of St. Thomas.—In the more elevated mountainous forests of the island, at about 2000 ft. alt.; a leaf only sent to Welwitsch in the year 1862 from this island under the name of Cannafistula. No. **1738**. 1861. No. **1738***b*.

The following No. is apparently an allied species:—

Huilla.—A small tree of 10 to 15 ft.; flowers not yet seen; pods 1 to 1½ ft. long, cylindrical, packed with a close sweet-bitter meal, many-celled; seeds vertical, not horizontal. In thickets near Huilla; fr. end of Oct. 1859. Coll. Carp. 17.

Possibly allied to *C. Fistula* L., but more slender; it is apparently the plant referred to by Welwitsch, Synopse, p. 52, n. 139 (1862), under the name of "Cassia fistula de Huilla," which he describes as a pretty little tree that adorns the thin forests composed of species of *Acacia*, *Protea*, *Erythrina*, Myrtaceæ, and *Parinari*, in the neighbourhood of Lopollo and of the lake Ivantàla in this district; the pulp of the pods has a peculiar well-defined aroma and a singular bitter-sweet taste; though the native medical men did not appear to employ the fruits in their drugs, Welwitsch recommended them to the attention of pharmacologists; the trees bear a large crop of pods.

2. **C. angolensis** Welw. ms., sp. n.

Cassia (sp.), *C. Mannii* Oliv. affinis, Oliv. Fl. Trop. Afr. ii. p. 272.

A handsome deciduous tree, 20 to 30 ft. high, loosely and patently branched; branches and branchlets slender, terete, striate, glabrescent and rather shining; leaves (young) about 9 in. long, 10-13-jugate, glabrescent; leaflets pretty uniformly distributed in pairs along the rachis at intervals of $\frac{2}{3}$ to $\frac{3}{4}$ in. from the base of the petiole, oval, emarginate or retuse at the apex, obtuse at the base, about $1\frac{1}{4}$ by $\frac{5}{8}$ in.; common petiole without glands; petiolules $\frac{1}{12}$ in. long or less; racemes lateral and terminal; common peduncle short; axis of the inflorescence 1 to $1\frac{1}{2}$ in. long, erect-patent, puberulous; pedicels nearly glabrous, 2 to 3 in. long, spreading; bracts obsolete; flowers showy, numerous, nearly 1 in. long; sepals oval, $\frac{1}{3}$ in. long, submembranous; petals deep golden-yellow, large, veiny; longer stamens nearly equalling the corolla, with rather thickened $\frac{1}{2}$-sigmoidly curved and bent filaments and large oval anthers; ovary glabrous; pods not seen.

Cazengo.—Rather rare, in primitive woods near Cacula, in company with two species of *Trema*; fl. and young leaves June 1855. No. **1736**.

3. **C. goratensis** Fresen. in Flora 1839, p. 53; Oliv., *l.c.*, p. 273; Benth., *l.c.*, p. 528 (1871).

Bumbo.—A tall shrub. In forests near Bumbo; fr. 15 Oct. 1859. Coll. Carp. 71. A bushy shrub, almost leafless when in flower and fruit. In stony thickets at the skirts of primitive woods, between Bumbo and Bruco, at an elevation of 2400 ft. at the base of the mountains of Serra da Xella; fl. and fr. (and the leafy individuals barren) Oct. 1859. No. **1727**.

Huilla.—A small tree or a shrub; flowers dull-yellow. In the exposed stony parts of the open mixed woods near Mumpulla, in company with species of *Protea*, at an elevation of about 4100 ft.; fl. and fr. Oct. 1859. No. **1728**. A small tree, 6 to 10 ft. high, with a loosely diffuse crown. In the more open sandy woods near Lopollo, in company with *Tounatea madagascariensis* Taub., and with species of *Protea*; fl. and sparingly fr. Jan. and Feb. 1860. No. **1729**.

4. **C. occidentalis** L. Sp. Pl. edit. 1, p. 377 (1753); Oliv., *l.c.*, p. 274; Benth., *l.c.*, p. 532 (1871); Ficalho, Pl. Uteis, p. 152 (1884).

Cassia (sp.), Welw. Apont. p. 575 under n. 175 ("Mudianhoca").

Ambriz.—In waste places around Banga de Quisembo; fl. and fr. Nov. 1853. Called by the Portuguese "Fedegoso." No. **1723**.

Loanda.—Sometimes an annual herb, at other times woody and biennial or triennial. Leaves 4- or rarely 5-jugate. Common about habitations, at Quicuxe flowering in May 1854, and throughout the district flowering and fruiting during nearly the whole year, 1854 and Dec. 1858. Called by the negroes "Munhanoca." No. **1724**.

Golungo Alto.—Not uncommon in rather dry thickets and in the vicinity of houses, near Sange in beds of *Andropogon*; fl. and fr. June 1856. No. **1725**. Called "Caffé" by the negroes; fr. Coll. Carp. 476.

Island of St. Thomas.—Dec. 1860; fr. Coll. Carp. 390.

A decoction of the root is employed in Angola in cases of intermittent fever after the manner of coffee-berries, and it was relished by Welwitsch himself; see also Monteiro, Angola, vol. ii. p. 249 (1875).

5. **C. Tora** L. Sp. Pl. edit. 1, p. 376 (1753); Oliv., *l.c.*, p. 275; Benth., *l.c.*, p. 535 (1871).

Golungo Alto.—A suffruticose herb, occasionally an annual, 2 to $3\frac{1}{2}$ ft. high, glaucous, with golden-yellow flowers. In grassy thickets between Bango and Mata de Quisuculo; fl. and fr. May 1856. No. **1734**. An erect branched herb, 1 to $1\frac{1}{2}$ ft. high, with pari-pinnate 3-jugate leaves and yellow flowers marked with green veins, a summer form in Feb. 1855; also a winter form sending forth further lateral flowering branches in August 1855; near Bango Aquitamba. No. **1734***b*. An undershrub, $2\frac{1}{2}$ to 4 ft. high, with orange-yellow flowers; fr. 30 Sept. 1855. Coll. Carp. 480. Annual or biennial; stem straight, branched; leaflets broad, obovate, very obtuse, glaucous, in 2 or 3 pairs. In hilly situations near Quibixe; fr. end of Sept. 1855. Coll. Carp. 481.

6. **C. didymobotrya** Fresen. in Flora, 1839, p. 53; Oliv., *l.c.*, p. 276; Benth, *l.c.*, p. 551 (1871).

C. bracteosa Welw. ex W. Bull, Retail List, n. 14, p. 4 (1866); Oliv., *l.c.*, p. 277. *Cassia* (sp.), Welw. Apont. p. 588. n. 61.

Golungo Alto.—Flowers saffron-yellow, large; bracts very large, black with a bluish tinge. In reedy thickets and exposed wooded places, near Sange and in Sobato de Quilombo Quiacatubia at an elevation of 2400 ft., flowering 2 or 3 times a year; fl. and fr. Feb. 1855 and August 1856. No. **1735**. A shrub, 5 to 10 ft. high; flowers deep-yellow, crowded in very long spikes. In thickets at Canguerasange; fr. Oct. 1854. Coll. Carp. 477.

Pungo Andongo.—A shrub or small tree, 5 to 8 ft. high, with very handsome golden-coloured flowers; fr. Oct. 1856 and June 1857. Coll. Carp. 171.

7. **C. obovata** Collad. Hist. Cass. Med. p. 92, t. 15, A. (1816); Oliv., *l.c.*, 277; Benth., *l.c.*, p. 553 (1871); Ficalho, Pl. Uteis, p. 153.

Mossamedes and Benguella.—A perennial prostrate glaucous herb, flowering the first year; peduncles shorter than the leaves; flowers yellow; pods elongate-reniform, wedge shaped at the base, 3 to 4 times longer than broad. At Praia da Amelia near the city of Mossamedes, also in sandy places on the coast near Benguella; fl. and fr. June 1859. No. **1726**. Stems prostrate in a circle; leaves glaucous; legumes lunate-falcate, compressed, with a crested line running along each face. In sandy places near the city of Benguella; fr. June 1859. Coll. Carp. 108.

8. **C. Absus** L. Sp. Pl. edit. 1, p. 376 (1753); Oliv., *l.c.*, p. 279; Benth., *l.c.*, p. 558.

Ambriz.—A viscid-glandular herb. In rough bushy places near Quisembo; fl. and fr. Nov. 1853. No. **1730**.

Loanda.—An annual herb, 1 to 2 ft. high, branched from the base; leaves abruptly bijugate; flowers yellow. In sandy hilly places with short herbage, above the city of Loanda near Alto das Cruzes, hardly in full fl. Dec. 1853. Also in groves of *Euphorbia*, sporadically in grassy sandy and clayey places between Teba and Cacuaco; fr. Dec. 1858. No. **1731**.

Golungo Alto.—A herb, 2 to 3 ft. high or more, with glaucescent leaves and yellow flowers. On the dry mountainous pastures of the Serra de Alto Queta, in company with species of *Andropogon* and *Gladiolus*; fl. and fr. Feb. and again end of June 1856. No. **1732**.

Pungo Andongo.—In sandy-clayey shortly-bushy hilly places on the left bank of the river Lutete; fl. and fr. June 1857. No. **1733**.

9. **C. Grantii** Oliv. Fl. Trop. Afr. ii. p. 279; Benth., *l.c.*, p. 571.
Var. **pilosula** Oliv. Fl. Trop. Afr. ii. p. 280.

Golungo Alto.—A slender undershrub, 2 to 5 ft. high, patently branched; stems 2 to 4 from the crown of the perennial root, scarcely as thick as a raven's quill, rather terete, tenacious, purplish, sometimes sub-erect sub-simple and 2 ft. high but usually ascending, branched at the base with elongated subscandent branches of 1 to 2 ft. and then the stems attaining 4 to 5 ft.; branches always horizontally decumbent or leaning on the neighbouring little shrubs; stems petioles stipules and all parts of the inflorescence except the corolla shaggy or ciliate with sparse thin rather long whitish pilose hairs; leaves mostly 5-6-jugate; leaflets oblong or obovate-oblong, rotundate-obtuse, mucronulate, glabrous but very thinly setose-ciliate on the margin, glaucescent. Plentiful but seen only in one spot, in bushy wooded places at the skirts of Mata de Quisucula; fl. and fr. April 1856. No. **1722**.

10. **C. mimosoides** L. Sp. Pl. edit. 1, p. 379 (1753); Benth., *l.c.*, p. 579; Oliv., *l.c.*, p. 280.
C. gracillima Welw. Apont. p. 590, n. 88.

Ambriz.—In wooded places near Quibanga; fl. and fr. Nov. 1853. No. **1709**.

Loanda.—Very common, in hilly places covered with herbage (and formerly ornamented with *Hyphæne thebaica* Mart), near the city of Loanda, fl. and fr. Jan. to March 1854. Alto das Cruzes, fully in fr. April and beginning of May 1854. No. **1710**. A very slender and elegant shrub, 1 to 1½ ft. high, with a Mimosoid habit. Between Bemposta and Camuma, in fr. 18 May 1859, in pastures; fr. Coll. Carp. 478.

Golungo Alto.—An ascending undershrub, 2 to 3 ft. high; leaves 50-60-jugate; flowers yellow. In the drier parts of the smaller thickets of Sobato de Bumba, amongst tall herbage; fl. and fr. April 1856. No. **1711**. In groves of the oil-palm, near the river Cuango; fl. May 1855, rather rare. No. **1711***b*.

Ambaca.—An undershrub or almost a small shrub; root long, straight, very thin, woody-fibrous; stems ascending or prostrate; pods linear, black. In shortly bushy sandy pastures, at an elevation of 2900 ft., between the river Lucala and Hâlo; fl. and fr. Oct. 1856. No. **1712**. A strictly erect undershrub, very pretty, 3 to 4 ft. high, sparingly branched; branches erect-subpatent; flowers yellow. Sparingly in hilly thickets from Puri-Cacarambola in the direction of N-gombe; fl. and fr. Oct. 1856. No. **1713**. A little shrub, 2 to 3 ft. high; fl. Oct. 1856, fr. June 1857. Coll. Carp. 479.

Pungo Andongo.—An undershrub, from a few inches to 3 ft. high, always erect. Among herbage near Sansamanda by the banks of the river Cuanza; fl. Feb. 1857. No. **1715**. In the borders of woods near Condo, at the great cataract of the river Cuanza, one specimen; fl. March 1857. No. **1714**. From the thick rootstock 10 to 20 stems ascending. Frequent, in moist meadows at the base of Serra de Pedras de Guinga, in company with species of *Scleria*, Irideæ, etc.; fl. and fr. March 1857. No. **1716**.

Huilla.—A tender herb, ever erect but soon dying; a small-leaved form; flowers pale-yellow. Very common, in damp wooded meadows between Catumba and Monino on the left bank of the river Lopollo: fl. and fr. March and April 1860. No. **1717**. A dwarf perennial herb, 2 to 3 in. high, with numerous stems; rootstock fleshy-subtuberculate. In hilly bushy pastures, rather dry but at times irrigated with copious

rains, near Catumba ; in fl. Nov. 1859. No. **1718**. Common in hilly sandy-stony places near Mumpulla, in company with species of *Thesium* and Thymeleæ, etc., sparingly ; fl. and fr. Oct. 1859 (subsequently found to have been destroyed by fire); a dwarf form with large flowers, about $\frac{2}{3}$ in. long, which much resembles some states of *C. capensis* Thunb. No. **1719**. A slender erect undershrub, woody at the base ; flowers larger, of a splendid orange colour ; calyx almost entirely petaloid. In the more elevated pastures of Empalanca, at 5200 ft. alt., picked up hurriedly while reconnoitring ; fl. end of March 1860. No. **1720**.

11. **C. Kirkii** Oliv. Fl. Trop. Afr. ii. p. 281 ; Benth., *l.c.*, p. 580.

Huilla.—A robust erect ornamental undershrub, usually branched, 2 ft. high ; stems rigid, purple, hard-woody, tomentose especially above and on the branches ; leaves 12-32-jugate ; leaflets very gibbous at the base on one side ; petiole with a dark-purple hemispherical gland at the base ; flowers axillary, large, of a fine orange colour ; peduncles densely bracteolate, 3-4-flowered ; pedicels unequal ; sepals $\frac{1}{3}$ or $\frac{1}{2}$ shorter than the petals, acuminate, dark-purple ; style arched, nearly as long as the ovary. Abundant in bushy-grassy wooded places between Eme and Monino ; fl. Dec. 1859, fr. Feb. 1860. No. **1721**.

12. **C. bicapsularis** L. Sp. Pl. edit. 1, p. 376 (1753); Schmidt, Beitr. Fl. Cap. Verd. Ins. pp. 23, 339 (1852); Benth., *l.c.*, p. 525.

Cape de Verde Islands.—A much-branched shrub, as tall as a man. Cultivated in the island of St. Jago ; fl. Jan. 1861. No. **1737**.

The specimen appears to belong to this species, which is a native of Tropical America and is not unfrequently introduced into India and elsewhere. The following should be compared with the same species and with *Cassia floribunda* Cav. ; Lowe, *l.c.*, p. 228 :—

Cape de Verde Islands.—Cultivated with crops in the public garden at Villa de Mindello, St. Vincent ; fl. Jan. 1861. No. **1741**. A shrub 6 to 7 ft. high and very much branched, almost a small tree, well worthy of cultivation. Cultivated in the island of St. Vincent ; fr. Jan. 1861. Coll. Carp. 483.

13. **C. corymbosa** Lam. Encycl. Méth. i. p. 644 (1783); Benth., *l.c.*, p. 526 ; vel affinis.

Cape de Verde Islands.—A much branched bushy profusely flowering shrub. Cultivated in the public garden of the Island of St. Vincent, at Praia de Mindello ; fl. Jan. 1861. No. **1739**.

The species, to which this No. apparently belongs, is a native of South America.

67. **DIALIUM** L. ; Benth. & Hook. f. Gen. Pl. i. p. 574.

1. **D. guineense** Willd. in Roem. Arch. i. p. 30, t. 6 (1796); Oliv. Fl. Trop. Afr. ii. p. 283; Ficalho, Pl. Uteis, p. 153 (1884).
Codarium acutifolium Afzel. Gen. Pl. Guin. p. 23 (1804).

Island of St. Thomas.—A small tree, called by the negroes "Salamba." In the mountainous forests of the Monte Caffé, at an elevation of about 2000 ft. above the sea ; in flower-bud Dec. 1860. No. **4127**.

2. **D. angolense** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 283 ; Ficalho, Pl. Uteis, p. 153.

Pungo Andongo.—Trunk at the height of 5 to 7 ft. patently

branched, with a rather lax crown ; leaves thickly coriaceous, of a very bright-green colour, shining, closely veined on both surfaces ; flowers yellowish, waxy ; calyx yellow-greenish ; filaments green, thick : anthers ovate, yellow ; ovary central, sessile, ovate, densely rufous-villous, nearly black ; legume ovate, flatly compressed, eaten by the negroes. Not uncommon in the woods on the island Calemba in the river Cuanza, between Condo and Quisonde ; flowering above and in young fr. below, 12 March 1857. No. **602**.

As suggested by Oliver, *l.c.*, this plant may prove to belong to a race of *D. guineense*, Willd. ; in Angola the name of the former is "Velvet Tamarind," and the same name is applied to the latter in Sierra Leone.

68. **GRIFFONIA** Baill. in Adansonia vi. p. 188 in note (7 Oct. 1865) ; non Hook. f. *Bandeiræa* Welw. ex Benth. & Hook. f. Gen. Pl. i. p. 577 (Oct. 1865).

Baillon in Adansonia vii. p. 222 in note (1866) claims priority of publication for his *Griffonia* over Welwitsch's name.

1. **G. speciosa** Taub. in Engl. & Prantl, Nat. Pflanzenfam. iii. p. 147 (1892).

Bandeiræa speciosa Welw. ex Benth. in Trans. Linn. Soc. xxv. p. 306, t. 40 (1865) ; Welw. Sert. Ang. p. 26, name only (1869) ; Oliv. Fl. Trop. Afr. ii. p. 284.

Golungo Alto.—A very beautiful climbing shrub, with dark-purple regular flowers like those of *Fuchsia* ; calyx scarlet, waxy-brittle ; petals obscurely herbaceous-green, very brittle ; ovary few-ovuled ; rather rarely, fl. Nov. 1854. A scandent shrub, sometimes a small tree, rather rarely flowering ; flowers with the aspect of those of *Schotia* ; in the bushy parts of palm-groves, near Bango ; fl. Sept. 1855. Not uncommon in thickets around Canguerasange ; a shrub, 4 to 5 ft. high, much and patently branched ; seeds obovate-circular or quite circular, lenticular-compressed, girt with a rather acute margin, quite black, $\frac{1}{2}$ to $\frac{2}{3}$ in. diam. ; testa rather thickly membranous ; embryo straight ; cotyledons of the same shape as the seed, black, fleshy, on the margin sharp, rather convex on the external surface, flat on the internal surface ; radicle sub-oblique, short, exserted, very obtusely conical ; fl. and fr. Jan. 1855. No. **559**. Coll. Carp. 538. In the primitive woods around Delamboa, widely climbing on trees with *Dalhousiea africana* S. Moore ; fl. Feb. 1855 ; forms with more acute leaves. Also in mountainous wooded stations in Sobato de Bumba, Oct. 1855. No. **559***b*. On the highest parts of Cungulungulo ; fr. Feb. 1855. Only one pod ; it measured $2\frac{1}{3}$ in. long by $1\frac{1}{3}$ in. thick by $\frac{2}{5}$ in. deep, on a pedicel of 1 in. Coll. Carp. 484. A shrub standing erect or usually scandent ; flowers red-scarlet ; pods inflated, quite black, 1 to $1\frac{1}{2}$ in. long, 2-4-seeded ; seeds transverse. Bango Aquitamba ; fr. June. Coll. Carp. 495.

The plant occurred in company with *Cacoucia platyptera* Welw. Herb. No. 1752 ; see Welw. Sert. Angol. p. 26.

Coll. Carp. 496 consists of seeds of *Schotia speciosa* Jacq., from a cultivated specimen obtained for comparison with this species of *Griffonia*.

69. **BAUHINIA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 575.

1. **B. cissoides** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 287.

Ambaca.—A climbing shrub or undershrub, with the habit of *Vitis*

and giving the country the appearance as if planted with *Vitis vinifera* L. ; flowers large, of a sulphur-orange colour. Very common, in stony thickets from Isanga to Ambaca ; fl. and young fr. Oct. 1856, at Lutete in Jan. 1857 ; with ripe fr. June 1857. No. **552**.

Pungo Andongo.—An undershrub, with horizontally trailing shoots 4 to 10 ft. long. In rocky thickets near the river Cuanza, frequent ; without fl. March 1857. Near Candamba ; with fr. March 1857. No. **551**. A suffruticose herb, climbing far and widely over shrubs and on the herbaceous ground, when not in flower perfectly simulating a *Cissus* ; flowers handsome, turning from orange to wine-red ; by the great cataract near Condo ; fl. March 1857. No. **551***b*.

2. **B. Welwitschii** Oliv. Fl. Trop. Afr. ii. p. 287.

Pungo Andongo.—A procumbent and scandent undershrub ; flowers of a wine-citron colour, at length blood-red. In the moist parts of the very high rocks of Tunda Quilombo ; fl. Jan. 1857, in young fr. April 1857. No. **554**.

The following No. perhaps belongs to the same species, as suggested by Oliver, *l.c.*, p. 288 ; the species, however, seems to me to be doubtfully distinct from *B. cissoides* :—

Huilla.—Leaves broadly sinuate, glaucous above. On bushy slopes with tall herbage, near the great lake of Ivantâla ; in young fr. Feb. 1860. No. **553**.

3. **B. tomentosa** L. Sp. Pl. edit. 1, p. 375 (1753) ; Oliv., *l.c.*, 290. *Alvesia Bauhinioides*, Welw. Apont. p. 587, n. 47.

Loanda.—A shrub ; flowers handsome, of a deep sulphur colour, nodding or very spreading. By the rocks along the sea coast near Praia do Bispo ; fl. Feb. 1858, fr. June 1855. Also near Morro da Cruiz among Aloes ; fl. and fr. Jan. and April 1854. No. **557**.

Golungo Alto.—A very elegant little tree of 6 to 12 ft. or oftener a shrub of 5 to 6 ft. ; stems straight ; branches spreading ; flowers deep sulphur-yellow, large. At the borders of woods by the road to Ambaca near Sange ; fr. June 1856. Also on the slopes of the mountains near the river Xixe ; in young fl. Oct. 1854. No. **556**. Petals marked inside with a purple spot at the base. At the margins of primitive woods ; fr. June and August 1857. Coll. Carp. 485.

Pungo Andongo.—A shrub, 5 to 10 ft. high ; flowers large, of a deep sulphur colour, with purple spots inside, connivent in a campanulate manner, rather nodding. In wooded thickets near Quitage : fl. March 1857. No. **558**.

4. **B. acuminata** L. Sp. Pl. edit. 1, p. 375 (1753) ; Oliv., *l.c.*, p. 290, in note.

Sierra Leone.—In wooded places, on the way to and behind the Sugar Loaf Mountains ; fl. and young fr. Sept. 1853. No. **555**.

So determined by Oliver, *l.c.* ; the species is East Indian, whence the plant has apparently been introduced into Sierra Leone.

5. **B. reticulata** DC. Prodr. ii. p. 515 (1825) ; Oliv. Fl. Trop. Afr. ii. p. 290 (*articulata*) ; Ficalho, Pl. Uteis, p. 153 (1884).

Locellaria Bauhinioides Welw. Apont. p. 588, n. 52. *Bauhinia* (sp.), Welw. Apont. p. 575 under n. 175 ; Welw. Synopse, p. 32, n. 77.

Loanda.—Occasionally cultivated near the city of Loanda on account of the bark affording an astringent remedy as a wash for wounds. Imbondeiro dos Lobos ; fl. Oct. 1853 and May 1854. Native name

"Mulôlo." Abundant, first near Calumguembo, in Zenza do Golungo, and even more frequent throughout the districts of Golungo Alto and Cazengo to Ambaca, where it begins to become scarce. Fl. Sept. to May. Calungula; fl. Sept. 1857. No. **546** *bis*. A small leafy tree, with elongate-patent branches and white flowers. In moist places near stagnant pools, very rare; seeds July 1854. COLL. CARP. 487.

ZENZA DO GOLUNGO.—Legumes indehiscent, compact and corky-spongy inside, transversely many (80 to 100)-loculate; seeds 80 to 100. Native name "Mulolo." Fr. Sept. 1857. COLL. CARP. 486.

GOLUNGO ALTO.—A tree, 9 to 15 ft. high, rarely as much as 20 ft., of stately appearance in primitive forests; trunk 4 to 10, rarely attaining 18 in. diam. at the base, nearly always more or less obliquely twisted; branches divaricate-tortuous; leaves bi-lobed, coriaceous; flowers whitish, or from whitish verging on rose-colour; calyx campanulate, limb 5-cleft; petals 5, unguiculate, inserted on the calyx; limb ovate-subrotund, crenate and crisp on the margin, imbricate in æstivation, purplish-white, hardly ever fully expanded, fugacious; stamens 10, inserted with the petals, all fertile; anthers white, incumbent, 2-celled, oblong, dehiscing longitudinally; style straight, thick, almost subclavate, stigmatose at the apex; legume dry, woody, indehiscent, 8 to 10 in. long, 1 to 1½ in. broad, very hard, usually tortuous and shapeless. Abundant throughout the district, in the drier thickets and on dry and sandy slopes, almost always in company with "Molungo" (*Erythrina suberifera* Welw. Herb. Nos. 2229, 2230), and sometimes with tall species of *Pennisetum*; fl. and fr. Sept. 1854; in Sobato de Mussengue, near Menhalula, fl. and fr. 21 May 1855. The tree contains much tannin, but is in this respect much inferior to *Albizzia coriaria* Welw. Herb. 1762 to 1765; the bark and leaves are crushed and applied to wounds and ulcers. Native names "Mulolo" or "Musacamia." No. **547**.

PUNGO ANDONGO.—A tree, 6 to 12 ft. high, with astringent bark; flowers whitish; pods many-celled. Occasional in the wooded thickets of the fortress, in the direction of Cazella, etc.; fl. Dec. 1856. No. **548**.

HUILLA.—A tree, 7 to 10 ft., with a dense crown, but not giving much shade. In woods near Eme, common; fr. April 1860. No. **549**.

The bark of Mulolo is generally employed as an astringent decoction in cases of intermittent fever and eruptions, and to cleanse ulcers, as in this last case Welwitsch could affirm by personal experience; the same bark also contains a colouring matter, the colour of canella (see Welwitsch, Synopse, p. 32, n. 77).

6. **B. garipensis** E. Mey. Comment. Pl. Afr. Austr. i. p. 162 (1836); Oliv., *l.c.*, p. 291.

MOSSAMEDES.—A pretty nearly arborescent shrub, 5 to 8 ft. high, with approximated virgate branchlets 1 to 3 ft. long; bark persistently whitish-ashy, farinaceous-pruinose; leaves glaucous, thinly coriaceous, occasionally 1½ in. broad and ¾ in. long, thus larger than in the type of the species; flowers yellowish with purple veins; petals scarcely twice the calyx. Legumes subglabrous or somewhat glandular, dehiscent. In tall thickets along the banks of the river Maiombo, near Pomangala and below Cazimba, also near Quitibe de Baixo; fl. and nearly ripe fr. Oct. 1859. No. **1708**. A shrub, the numerous stems and branches virgate-sarmentose; leaves obcordate; flowers cinereous—purplish—striate; legumes hatchet-shaped, 2-3-seeded. Abundant between Pomangala and Quitibe de Baixo; fl. and fr. 14 Oct. 1859. COLL. CARP. 469.

70. **BERLINIA** Solander; Benth. & Hook. f. Gen. Pl. i. p. 579.

1. **B. paniculata** Benth. in Trans. Linn. Soc. xxv. p. 311 (1865); Welw. in Trans. Linn. Soc. Lond. xxvii. t. 22 (ramulus, *fig.* 10, not *fig.* 1) (1869); Oliv. Fl. Trop. Afr. ii. p. 295; Ficalho, Pl. Uteis, p. 155 (1884).

Huilla.—A tree, 10 to 25 ft. high, with a broad crown, frequently flowering in the young state when only 5 to 6 ft. high; forming forests mixed with other species of the same or allied genera; stamens diadelphous, one connate at the base only; March 1860. No. **581**. A moderate-sized tree, 13 to 30 ft. high, with spreading branches; flowers whitish-yellow. Frequent and constituting little woods, between Mumpulla and Nene; fl. and fr. Oct. 1859. No. **582**. A tree 15 to 25 ft. high, the matrix of the male flowers of *Pilostyles æthiopica* Welw. Herb. No. 529; in the mountainous woods between Lopollo and Monino, at an elevation of about 5500 ft. above the sea-level; without fl. or fr. 10 May 1860. One of the trees called "Panda." No. **577**.

Var. **glabrior** Oliv., *l.c.*

Pungo Andongo.—A moderate-sized tree with a lax crown; flowers white. The trunk when cut through shows a resinous ring about the centre not next the interior of the bark. Forms forests together with the trees called "Homoë," "Panda," "Mututu," "Muzamba," and "N-punda." All these trees supply excellent building-timber and firewood, but are frequently found mutilated by conflagrations in the forests and so appear only as shrubs of 6 to 8 ft. in height which flower not very rarely but scarcely ever perfect their fruit. In woods around the fortress of Pungo Andongo up to the banks of the river Cuanza; fl. and young fr. 1 May 1857. Native name "Mutóë." No. **567**. A form with obtuse leaflets, in company with the above near Sansamanda; fl. May 1857 (no specimen separated for the British Museum). No. **567***b*.

Var. ? **ferruginea** Benth., *l.c.*; Oliv., *l.c.*

Huilla.—A tree, 10 to 20 ft. high, with dilated crown. Rather rare, in but little dense stony woods near Mumpulla, in the plain of Huilla; fr. Oct. 1859. No. **576**, and Coll. Carp. 455.

2. **B. angolensis** Welw. ex Benth., *l.c.*, p. 310 (1865); Oliv., *l.c.*, p. 296; Ficalho, Pl. Uteis, p. 155.

Pungo Andongo.—A tree, about 25 ft. high, with a lax crown; habit that of "Panda" but with two or three times larger leaves and less lofty and also with the pod two or three times greater. In the but little dense primitive forests of "Mata de Mangue," between the town of Pungo Andongo and Candumba, very sporadic; fl. Jan. 1857. Native name "Homoë." No. **568**.

Var. **subcordata** (Welw.), Oliv., *l.c.*

Pungo Andongo.—A tree, 25 to 30 ft. high, with lax branches; fruit nearly 9 in. long, obliquely and densely wrinkled. In forests near the river Cuanza; fr. 1 May 1857. In mixed forests along the banks of the river Cuanza between the fortress and Candumba; fl. Jan. 1857. Native name "Homoë." No. **569**.

The following No. perhaps belongs to this species, but should be compared with No. 575 mentioned under *Brachystegia spiciformis* Benth.:—

Pungo Andongo.—A tree, 20 to 25 ft. high, with the habit of

"Mutone" (No. 567) or of the large-leaved "Panda" (Nos. 568, 569). In open woods near Luxillo and Cazella; without fl. Dec. 1856. Also near Quitage, not far from salt springs; a shrub 5 to 6 ft. high always barren, March 1857. No. **570**. Cf. COLL. CARP. 491.

71. **VOUAPA** Aubl. Hist. Pl. Guian. p. 25, tt. 7, 8 (1775). *Macrolobium* Schreb (1789); Benth. & Hook. f. Gen. Pl. i. p. 579.

1. **V. macrophylla** Baill. in Adansonia, vi. p. 178, t. 3, f. 6 (1865). *Macrolobium Palisoti* Benth. in Trans. Linn. Soc. xxv. p. 308 (1865); Oliv. Fl. Trop. Afr. ii. p. 297.

GOLUNGO ALTO.—A tree of moderate size, with a straight trunk, in the primitive forests 30 to 40 ft. high with the trunk 2 to 3 ft. in diam. at its base; bark whitish or coriaceous; leaves deep glossy-green above, silvery-shining beneath, sub-coriaceous; calyx bi-bracteolate, tube short and ventricose, limb bilabiate and 4-cleft, the three anterior lobes equal, the posterior one broader and more or less bifid, all green and rather fleshy; petals 5, inserted on the throat of the calyx, all white or greenish-white or soon turning yellowish-cinnamon or four green and the longest one cinnamon-tawny, the four anterior ones equal very small 3 or 4 times shorter than the calyx-lobes, the fifth one posterior large longer than the calyx-lobes obcordate-spathulate with a channelled claw, limbs deeply cordate-excised with connivent lobes; stamens 9, inserted in two series, 5 exterior and 4 interior, the 5 exterior ones larger and alternating with the petals, usually 3 of them (rarely only 1 or 2 very rarely 4) fertile and the other 2 posterior smaller and inserted on each side of the large petal, the 4 interior ones rudimentary (sometimes reduced to 3 or 2) opposite the minute petals; ovary ovate-lanceolate, densely hairy shortly stipitate, 1-celled; ovules 4 or 5, ellipsoidal, pendulous; style filiform elongate, curved above the middle; stigma narrowly capitate; pods dehiscent.

GOLUNGO ALTO.—In primitive forests in Sobato de Bumba near the cataract of Capopa, sporadic; end of August 1855. In Serra de Alto Queta at Zenzas de Queta and Quibolo, in mountainous primitive forests; fl. Dec. 1855 and May 1856, fr. August 1856. No. **560**.

PUNGO ANDONGO.—Mata de Pungo; fr. Jan. 1857. COLL. CARP. 535.

Welwitsch in Sert. Angol. p. 22 refers to forests comprised for the chief part of species of *Macrolobium* and another genus and situate in the district of Pungo Andongo; this species is doubtless intended.

72. **INTSIA** P. Thouars, Nov. Gen. Madag. n. 75 in Roemer, Collect. Bot. p. 212 (1809). *Afzelia* Sm. (1798); Benth. & Hook. Gen. Pl. i. p. 580; non Gmel. (1791).

1. **I. africana** O. Kuntze, Rev. Gen. Pl. i. p. 192 (1891). *Afzelia africana* Sm. in Trans. Linn. Soc. iv. p. 221 (1798); Oliv., *l.c.*, p. 302.

GOLUNGO ALTO.—A tree, 20 ft. high, with a dilated densely frondose crown, and habit of the genus. In secondary woods by the road leading from Sange towards Sobato de Bumba; leafy branches without either fl. or fr. Feb. 1856. This is doubtfully referred here; the leaflets much resemble those of No. 1738 which has been doubtfully referred to *Cassia Sieberiana* DC., but they are less numerous (in 5 pairs). No. **592**.

2. **I. cuanzensis** O. Kuntze, Rev. Gen. Pl. i. p. 192 (1891). *Afzelia quanzensis* Welw. Apont. p. 586, n. 35 (1859); Oliv., *l.c.*, p. 302 (*cuanzensis*).

Golungo Alto.—A tree with the habit of *Ceratonia Siliqua* L., 15 to 28 ft. high ; crown ample, spreading ; branches patent ; branchlets drooping ; leaves abruptly pinnate, 4 to 9- or even 10-jugate ; leaflets coriaceous, yellowish-green and glossy above, glaucous beneath with the yellowish midrib rather prominent ; calyx velvety, green, fleshy, bibracteate at the base ; bracts large, rather fleshy, concave, obtuse ; calyx-tube turbinate ; limb 4-partite, segments obovate-oblong, rather rigid, concave, two opposite ones smaller than the others ; petal solitary, inserted on the throat of the calyx, opposite to the carinal suture of the ovary, with a long channelled green claw ; limb broadly obcordate or rarely 3 or 4-lobed, blood-red-scarlet inside ; more or less curved-inflected as if protecting the ovary ; stamens 7 to 9, inserted with the petal, variously bent or tortuous, more or less united at the base, yellowish-green, 5 to 7 of them fertile ; anthers cordate, 2-celled, longitudinally dehiscing ; ovary shortly stipitate, rather pilose, compressed, curved in a sigmoid manner ; style arching ; stigma narrowly capitate (as a thickened and truncate tip of the style), very delicately papillose. Sobato de Bumba, at the margin of the forest, near Sange, very rare, only one tree seen ; fl. beginning of Dec. 1855. The wood is used for musical instruments. No. **628**. Near Sange in wooded situations, rare ; fl. Jan. 1855. Probably introduced into this district from the banks of the river Cuanza, where it forms a prominent feature in the character of the landscape. No. **593**. Coll. Carp. 490.

Pungo Andongo.—A tree, 12 to 25 ft. high ; crown depressed-dilated in the form of an umbrella ; the lower branches nodding ; legume woody, very hard, 6 to 9-seeded, many-celled, nearly two years old when ripe ; seeds as hard as a stone. Common in wooded stations along the banks of the river Cuanza ; from Sansamanda to Quisonde ; fl. Jan. 1857, ripe fr. May 1857. Near Candumba ; fr. March 1857. In company with *Phœnix spinosa* Schum. & Thonn., and with a species of *Combretum*. No. **594**. Coll. Carp. 173. Legume dehiscent. Candumba ; fr. March 1857. Coll. Carp. 489.

73. **CRYPTOSEPALUM** Benth. in Benth. & Hook. f. Gen. Pl. i. p. 584.

1. **C. ? mimosoides** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 305.

Pungo Andongo.—A dwarf shrub, a few inches high, resembling in habit *Cassia mimosoides* L. ; stems erect ; flower-buds red or rose-purple. At the margins of woods in bushy places near the great cataract of the river Cuanza at Condo ; in young fl. March 1857. No. **610**. Scarcely a foot high, cæspitose ; rootstock creeping ; branches erect or ascending. In the shady mountainous parts of woods composed of Muzamba (Herb. 571, see under *Brachystegia tamarindoides* Welw.), between Pedras de Guinga and Mutollo ; without either fl. or fr. March 1857. No. **611**. A small shrub, 4 to 6 in. high ; branches erect from a thick woody horizontal rootstock. In (mica-schist) stony places at the base of Pedras de Guinga, without either fl. or fr., Jan. 1857. No. **612**.

74. **BRACHYSTEGIA** Benth. in Benth. & Hook. f. Gen. Pl. i. p. 582. *Didelotia*, sect. *Brachystegia*, Taub., vix Baill.

1. **B. spicæformis** Benth. in Trans. Linn. Soc. xxv. p. 312 (1865) ; Welw. in Trans. Linn. Soc. Lond. xxvii. t. 22 (ramulus, *fig.* 1) (1869) ; Oliv. Fl. Trop. Afr. ii. p. 306 ; Ficalho, Pl. Uteis. p. 155 (1884).

HUILLA.—In thin woods between Mumpulla and Nene, rather frequent but sparingly in flower; fl. Oct. 1859. No. **578**. A tree, 20 to 35 ft. high and more, called by the negroes "Panda" or "Mupanda" as are also several other species of the same habit; common and gregarious in woods between Monino and the lake of Ivantâla; fr. Feb., April and May 1860. No. **580**. A tree, 20 to 25 ft. high, with depressed-ovoid crown, excellent bark, and evergreen foliage; frequent in woods between Humpata and Lopollo, but not then seen by Welwitsch in flower, Nov. 1859. Called "Mupondo." No. **580** *bis*. A tree, the matrix of the female flowers of *Pilostyles æthiopica* Welw.; in the elevated woods of Morro de Monino; fr. May 1860. No. **583**. Cf. COLL. CARP. 494.

Var. (?) **grandiflora** Benth., *l.c.*, p. 313; Oliv., *l.c.*

HUILLA.—A small tree, about 10 ft. high; on the top ranges of the mountains of Serra da Xella at an elevation of about 4000 ft.; almost without leaves but with young leaves at the extremities of the branches and with white flowers at the beginning of Oct. 1859. No. **579**.

The following Nos. may belong to this species, but should be compared with No. 570 which is mentioned under *Berlinia angolensis* Welw.; it should also be compared with *Berlinia paniculata* Benth.:—

PUNGO ANDONGO.—A tree, 25 to 40 ft. high and more; trunk straight, free from branches to the height of 10 to 15 ft.; with lax branches at the apex; forming very vast forests, called "Matas de Panda," around Pungo Andongo up to Sansamanda. Leaflets shortly and broadly pointed. Native name "Panda." Near Sansamanda; in leaf without fl. April 1857. No. **575**. Sansamanda; fr. 1 May 1857. COLL. CARP. 492. In sandy forests between the river Lutete and the fortress of Pungo Andongo; in leaf Oct. 1856. Local name "Panda verdadeira," that is, genuine Panda (a unique specimen). No. **575***b*. Luxillo; fr. May 1857. COLL. CARP. 493.

HUILLA.—Monino; fr. May 1860. Called "Panda." COLL. CARP. 494. Fr. May 1860. COLL. CARP. 498.

The following No. should be compared with *Brachystegia spiciformis* Benth.:—

HUILLA.—A small tree of 6 ft., mutilated by the winter conflagrations. In thickets at the borders of pastures near Nene; without fl. or fr. Oct. 1859. No. **617**.

2. **B. tamarindoides** Welw. ex Benth., *l.c.*, p. 312; Oliv., *l.c.*, p. 307; Ficalho, Pl. Uteis, p. 155.

HUILLA.—A tree, 15 to 25 ft. high or, in the forests free from conflagration, more than 40 ft. high, with the habit and foliage like those of *Tamarindus indica* L.; a remarkable ornament of the table-land of the district; crown thyrsiform; trunk branched a little above the base; branches and branchlets sub-tortuous; leaflets in the state of sleep bifariously imbricate upwards along the rachis. Common, occasionally constituting little woods, between Lopollo and the lake of Ivantâla; fl. Oct. 1859, in young fr. Feb. 1860. No. **585**. Fr. May 1860. COLL. CARP. 488. Fr. Feb. and May 1860. COLL. CARP. 497. A tree, 20 ft. high; branches erect-spreading, not divaricate as in No. 585; in wooded places at the banks of the river Cacolabar; without either fl. or fr. Feb. 1860. A doubtful member of this species. Nos. **585***b*, **4157**.

On No. 585 twines the Menispermaceous climber, *Stephania rotunda* Lour. (Welw. No. 2322).

To this or a nearly allied species Bentham and Oliver, *ll.cc.*, refer the following No.; the native name is "Muzamba":—

Pungo Andongo.—A handsome tree, 20 to 30 ft. high, with dilated crown, constituting very beautiful forests; branches elongated; timber whitish, valuable in every respect. Common, especially between Condo and Quisonde, also at the base of Serra de Pedras de Guinga, on the slopes of primitive woods, descending to the plains; in young fr. March 1857. No. **571**. At Sansamanda, at the beginning of May 1857, in nearly ripe fr. A unique specimen. No. **571*b***.

The following No. also appears to be not far removed from the above-mentioned species of *Brachystegia*; it must be compared with the genus *Cryptosepalum* and with the plant figured in Serpa Pinto's book, How I Crossed Africa, vol. i. p. 305 (1881); it also may prove to belong to the same species as Nos. 585*b* and 4157, and perhaps the same as Nos. 571 and 571*b*.

Huilla.—A small tree, about 8 ft. high, with the habit nearly of a *Pistacia*; sparingly in forests composed of species of *Eugenia* (Syzygium), Proteaceæ, etc., between Mumpulla and Nene; without either fl. or fr. Oct. 1859. No. **584**.

The next following No. cannot be satisfactorily determined; it has been regarded by Oliver, Fl. Trop. Afr. ii. p. 305, as probably a new species of *Cryptosepalum*, allied to *C.*? *mimosoides*, Welw., but Welwitsch thought that perhaps it was Muzamba No. 571:—

Pungo Andongo.—A small shrub, 1 to $2\frac{1}{2}$ ft. high; rootstock woody, with numerous stems; stems erect, cæspitose, perhaps the up-growth of a mutilated tree; branchlets rather spreading. The leaves of the younger portion of the plant are much larger than the lower and older leaves. Frequent in the primitive woods of Mata Grande near Pedras de Guinga and in the woods of Mutollo between Pedras de Guinga and Candumba, in the shade of forests consisting of Muzamba (Herb. 571); without either fl. or fr. Jan. and March 1857. No. **572**.

75. **TAMARINDUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 581.

1. **T. indica** L. Sp. Pl. edit. 1, p. 34 (1753); Welw. Apont. p. 574, under n. 175; Oliv. Fl. Trop. Afr. ii. p. 308; Ficalho, Pl. Uteis, p. 156 (1884).

Loanda.—A huge majestic tree, ranging up to 50 ft. in height, with a broad frondose crown, probably introduced in older times, frequently cultivated in Angola, especially in the littoral region and along the banks of the larger rivers, also occasionally spontaneous; celebrated in all parts for the agreeable acid pulp of its fruit. At Penedo near the city of Loanda; in good fl. and ripe fr. Dec. 1858. No. **564**.

Golungo Alto.—A small tree, 12 ft. high. In the garden of Senr. Rodrigo at Sange, in a spot a short distance from that of the heteromorphous variety (No. 588), not in a vigorous state and without fl. 14 Dec. 1854. No. **564*b***. A shrub, 5 ft. high, patently branched from the base; branchlets flexuous, divaricate; leaves glaucescent. In wooded bushy slopes, on a mica-schist substratum, perhaps formerly cultivated, near Sange; without fl. Feb. 1855. A heteromorphous variety or monstrosity, with many of the leaflets having long tails. Nos. **588**, **4156**.

Cazengo.—Not uncommonly cultivated along the banks of the rivers Luinha and Lucala, and occasionally spontaneous ; fl. and fr. Dec. 1854 and Jan. 1855. No. **565**.

Island of St. Thomas.—In fl. Dec. 1860. No. **566**.

76. **COPAIBA** Mill. Gard. Dict., edit. 7 (1759). *Copaiva* Jacq. Enum. Pl. Carib. p. 4 (1760). *Copaifera* L. (1762), Benth. & Hook. f. Gen. Pl. i. p. 585.

1. **C. Mopane** O. Kuntze, Rev. Gen. Pl. i. p. 172 (1891).

Copaifera? Mopane Kirk ex Benth. in Trans. Linn. Soc. xxv. p. 317, t. xliii. A. (1865); Benth. & Hook. f., *l.c.* ; Oliv. Fl. Trop. Afr. ii. p. 315 ; Ficalho, Pl. Uteis, p. 163 (1884).

Bumbo.—A handsome tree, with the habit of *Bauhinia* ; wood excellent ; resin coloured blood-red and called "Sangue de Drago false." Abundant and constituting extensive forests in rocky mountainous places about the base of Serra da Xella, in company with *Tamarix orientalis* Forsk. (Welw. No. 1086*b*), *Garcinia angolensis* Vesq. (Welw. No. 1048), *Acacia arabica* Willd. (Welw. No. 1827), and the fungus n. 488 ; near Bumbo in young leaf Oct. 1859. No. **605**. A tree, 15 to 50 ft. high, easily distinguished by the shape of its leaves, the character of its resin, and its resinous-glandular seeds ; at Quitibe between Bumbo and Maiombo, not seen in fl. ; fr. beginning of June 1860. Native name "M-tuate," "Unteate," "Umteate," or "Mutuate." Coll. Carp. 93, 500 and 501. A large tree from Bumbo, Gambos, and Humba. Called "Umfatido" ; fr. given by Secr. Mendonça July 1859. Coll. Carp. 502. Cf. Coll. Carp. 13.

77. **CYNOMETRA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 586.

1. **C. laxiflora** Benth. in Trans. Linn. Soc. xxv. p. 318 (1865) ; Welw. in Journ. Linn. Soc. ix. p. 300 (1866) ; Oliv. Fl. Trop. Afr. ii. p. 318 ; Ficalho, Pl. Uteis, p. 164 (1884).

Baphia? (sp.), Welw. Synopse, p. 12, under n. 23.

A handsome tree, 25 to 40 ft. high ; trunk very straight, 1 to $2\frac{1}{2}$ ft. diam. at the base ; wood whitish towards the circumference of the stem, of a more or less blood-red colour in the centre, very strong, of fine grain, heavy, durable, very useful, taking an excellent polish ; the older the trunk the broader and redder are the veins in the centre ; branches more or less fastigiate ; branchlets almost nodding. Flowers of a whitish-rose colour, almost Polygalaceous and suggesting *Securidaca* ; bracts rose-coloured when young, milk-white in the adult state. In moderate frequency along the borders of the mountains of Alto Queta in the district of Golungo Alto and of Muxaûlo in the district of Cazengo, nevertheless also occurring on the elevated plains of Ambaca and of Pungo Andongo. Some Portuguese colonists call this tree "Tacula falsa." (See Welwitsch, Synopse, p. 11, n. 23.)

Golungo Alto.—Amongst the elevated mountains of Serra de Alto Queta, forming dense woods in Mata de Mangas ; fl. beginning of Nov. 1855. Native name "Hûla" ; called also "Pao Tacula" and "Quibilibili," but it is not the Tacula of the Portuguese. No. **561**. In the elevated woods of Cungulungulo or Montalegro ; fl. Feb. and April

1855, without fl. Feb. 1856. Called by the natives "Hûla" or "Calalanza." No. **561***b*.

Var. **nitidula** Welw. ex Oliv., *l.c.*

ZENZA DO GOLUNGO.—An elegant tree, forming little forests; leaves much more compact and shining and with a more obtuse acumen, renewed each year in Oct. or Nov.; far advanced in fr., on elevated ground before and behind Quicanda, Sept. 1857. No. **562**.

Fungus n. 164 grew on the leaves of this species, on which also grew lichen n. 193.

The following No. perhaps belongs to this species:—

ZENZA DO GOLUNGO.—Branches with leaves of a tree from which gum copal was reported to Welwitsch to trickle; Calumguembo, Sept. 1857. No. **563**.

Cf. Welw. Synopse, p. 36, n. 96.

78. **BURKEA** Hook.; Benth. & Hook. f. Gen. Pl. i. p. 587.

1. **B. africana** Hook. Ic. Plant. tt. 593-4 (1843); Oliv. Fl. Trop. Afr. ii. p. 320; Ficalho, Pl. Uteis, p. 164 (1884).

HUILLA.—A small tree, 6 to 10 ft. high, with a lax broad crown. In sandy forests of species of Proteaceæ, *Eugenia*, etc., in Mata de Monino; sparingly in fl. Nov. 1859, in young fr. Dec. 1859, with a very few ripe fr. Feb. 1860. No. **589**.

Var. **cordata**, Welw. ex Oliv., *l.c.*

HUILLA.—A small tree, 6 to 10 ft. high, with a broad rather depressed crown. In woods between Lopollo and Monino, in young fr. Dec. 1859. No. **589***b*. A little shrub, a foot high, with cæspitose stems, or apparently the up-growth of a tree mutilated by fire. In the sandy forests of Monino where occasionally it occupies extensive tracts; without fl. or fr. Jan. and Feb. 1860. No. **590**.

Var. ? **andongensis** Oliv., *l.c.*

PUNGO ANDONGO.—A tree, 20 to 35 ft. high, with a lax more or less umbrageous crown. Native name "Cabilangáu." Frequently confused with "Gungolume" (No. 573; cf. *Gleditsia africana* Welw.). In the primitive woods about Pedras de Guinga; in young fr. Jan. 1857. (At Luxillo, a specimen of the wood.) No. **574**. Cf. No. **574** *bis*.

3. SUB-ORDER MIMOSEÆ.

79. **PENTACLETHRA** Benth.; Benth. & Hook. f. Gen. Pl. i. p. 588.

1. **P. macrophylla** Benth. in Hook. Journ. Bot. iv. p. 330 (1842); Oliv. Fl. Trop. Afr. ii. p. 322; Benth. in Trans. Linn. Soc. xxx. p. 360 (1875); Ficalho, Pl. Uteis, p. 171 (1884).

PRINCE'S ISLAND.—A tree 100 to 120 ft. high; native name "Sicupira," "Sucopira" or "Sucupira." In the primitive woods, at an elevation of 1500 ft.; the foliage and ripe fr. Sept. 1853. No. **1783**. Pico de Papagaio; seed Sept. 1853. COLL. CARP. 529. On this tree grew the lichen n. 118.

ISLAND OF ST. THOMAS.—In the primitive forests of Monte Caffé, at an elevation of 1800 to 2000 ft.; native name "Sicupira"; without fl. or fr. Dec. 1860. No. **1786**. COLL. CARP. 530.

Cf. B. A. Gomes in Jorn. Scienc. Lisbon, iv., p. 157 (1873).

80. **PARKIA** Br.; Benth. & Hook. f. Gen. Pl. i. p. 588.

1. **P. intermedia** Oliv. Fl. Trop. Afr. ii. p. 324; Benth. in Trans. Linn. Soc. xxx. p. 361 (1875); Ficalho, Pl. Uteis, p. 172 (1884).

Island of St. Thomas.—A tree about 30 ft. high, with very elegant crown. In mountainous situations, at the skirts of the forests of Monte Caffé, not common; fr. and with remains of fl. end of Dec. 1860. Native name "Luba" or "Luva." No. **1788**. A tree about 25 ft. high or more, with broad spreading crown; leaves like those of a *Mimosa*; flowers rose-coloured, very densely clustered about a fleshy globose receptacle cylindrical at the base. In primitive forests; fr. end of Dec. 1860. Coll. Carp. 503.

2. **P. filicoidea** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 324; Benth., *l.c.*, p. 361 (1875); Ficalho, Pl. Uteis, p. 172 (1884).
Parkia (sp.), Welw. Apont. p. 576 (1859).

Pungo Andongo.—A large handsome tree; trunk straight, 3 to 4 ft. in diam., 30 to 40 ft. high or more; crown dilated, at the time of flowering leafless or sparingly leafy with fresh leaves; branches patent; leaflets hard-coriaceous, in shape like those of an *Adiantum*; flowers red, densely packed with interposed bracteoles on claviform long-pedunculate pendulous receptacles; the odour of the opening flowers vinous-empyreumatic and penetrating a long distance. Legumes 1 to 1½ ft. long; seeds not seen, being eaten by monkeys. Sporadic, in the primitive forest of Mata de Pungo; in foliage Jan., fl. Feb. and April. No. **1787**. Old fr. end of May 1857. Coll. Carp. 504.

Cf. Schweinfurth, Heart of Africa, vol. i. pp. 221, 267, 444, vol. ii. p. 339; and P. Hennings in Engl. Deutsch-Ost-Afrika, B. p. 191 (1895).

81. **GIGALOBIUM** P. Browne, Hist. Jam. p. 362 (1756). *Entada* Adans. Fam. Pl. ii. p. 318 (1763); Benth. & Hook. f. Gen. Pl. i. p. 589.

1. **G. scandens.**

Entada Gigalobium DC. Prodr. ii. p. 424 (1825). *Mimosa scandens* L. Sp. Pl. edit. 2, p. 1501 (1763). *E. scandens* Benth. in Hook. Journ. Bot. iv. p. 332 (1842), and in Trans. Linn. Soc. xxx. p. 363 (1875); Oliv. Fl. Trop. Afr. ii. p. 325; Ficalho, Pl. Uteis, p. 172 (1884). *Entada* (sp.), Welw. Apont. p. 576 under n. 176. *Pusætha scandens* O. Kuntze, Rev. Gen. Pl. i. p. 204 (1891).

Golungo Alto.—A robust shrub, climbing high and widely; trunk 9 in. in diam. at the base; branches slender; leaflets glaucous-green; flowers from white-yellowish to yellow-ochre; fibre textile, suitable for ropes; pods gigantic, about 2½ ft. long when nearly ripe, and reaching 3 to 4 ft. long when fully grown, by far the largest of all legumes, spirally twisted, coriaceous, jointed; joints 1-seeded. In the primitive forests of the mountains of Serra de Alto Queta, sporadic; fl. and young fr. Jan. 1856; and again in the Eastern Queta, fl. middle of July 1856. Native name "Fûse" or "Fugi," hence "Quifuge." A native of Cabinda called it "Entada." No. **1779**. At Trombeta; seed July 1857. Coll. Carp. 505.

The large flat seed of this plant is a common fetish or charm to hang from the neck (see Monteiro, Angola, vol. i. p. 249, 1875).

2. **G. abyssinicum.**

Entada abyssinica Steud. in Herb. Schimp. Abyss. sect. ii. n. 520; A. Rich. Fl. Abyss. i. p. 234 (1847); Oliv., *l.c.*, p. 327; Benth. in

Trans. Linn. Soc. xxx. p. 364; Ficalho, Pl. Uteis, p. 173 (1884). *Pusætha abyssinica* O. Kuntze, *l.c.*

Golungo Alto.—A tree of 15 ft.; trunk nearly 1 ft. in diam. at the base. In the elevated forests of the mountain Cungulungulo; only two trees seen, fl. end of Nov. 1855; young fr. end of Feb. 1856. Local name "Musoço." No. **1781**. A tree in the primitive forests of the mountain Cungulungulo (Montalegre), at the top, 2 Feb. 1855; seeds scattered on the ground. Coll. Carp. 521. A small tree of 8 to 10 ft.; head very widely spread and elegant; pods flattened; layers separating from the replum; seeds with a fibrous-cartilaginous wing-shaped membrane. Bark officinal. Called "Muçoso." In wooded thickets near Sange, abundant; fr. August 1856, and June and August 1857. Coll. Carp. 506. A handsome tree of middle height, with the habit of the frondose acacias. In mountainous situations between the rivers Zenza and Lombixi; fr. July. Native name "Mussóxi." Coll. Carp. 507.

Huilla.—A handsome and pretty tree, 20 to 35 ft. high, or sometimes scarcely 10 ft., broadly leafy; flowers yellow, scented. Abundant in the more open woods between Lopollo and Catumba; fl. Dec. 1859. Called "Musoso." No. **1782**. A small tree, about 15 ft. high, the matrix of several plants of *Loranthus* (cf. Welw. No. 4890). In Mata de Monino in very mixed open woods, in company with species of *Protea*, *Eugenia*, Combretaceæ, etc.; fl. Nov. and Dec. 1859, fr. April 1860. No. **1782***b*. A widely frondose tree, 25 to 30 ft. high, with spicate-racemose yellow flowers. In forests near Lopollo; fr. Dec. 1859. Coll. Carp. 508.

Var. **microphylla** Oliv., *l.c.*, p. 328.

Golungo Alto.—A little tree, 8 ft. high. In secondary woods with tall bushes, between Sange and Ponte de Felix Simões; fl. Febr. and March, fr. July and beginning of August 1855. No. **1780**.

This species is probably the plant referred to by Welwitsch, Synopse, p. 33, n. 82, as a species of *Acacia*, and described as a small tree and very frequent in stony situations in Golungo Alto; the bark is called "Casca de Musoso," and is employed by the negro doctors as a decoction in cases of pains in the chest and especially in chronic coughs.

82. **PIPTADENIA** Benth.; Benth. & Hook. f. Gen. Pl. i. p. 589.

1. **P. africana** Hook. f. ex Benth. in Hook. Niger Fl. p. 330 (1849); Oliv. Fl. Trop. Afr. ii. p. 328; Benth. in Trans. Linn. Soc. xxx. p. 370 (1875); Ficalho, Pl. Uteis, p. 173 (1884).

Golungo Alto.—A tree 20 to 35 ft. high (in secondary woods 15 to 25 ft. high), patently and sparingly branched; branches elongated; wood excellent; glands of the petiole 0; pedicels as long as the calyx; flowers glabrous, arranged in paniculate crowded spikes of about 3 in. in length, yellowish-green; calyx cupola-shaped, repand-dentate at the mouth with 5 distinct teeth; anther-gland large, sub-quadrate, fugacious; ovary substipitate, glabrous; ovules about 10 to 15; legume ¾ to 1 ft. long, an inch broad, compressed, bivalved; valves cohering by one edge after the fall of the seeds; seeds surrounded by a broad membranous wing. Frequent in mountainous forests throughout the district, especially between Sange and Undelle, etc.; fr. June 1855, fl. Jan. 1856; near Bango Aquitamba, Jan. 1855; Fundo de Undelle at the end of May 1856. Native name "Páo Musence" or "Muzungo" or "Muneunza." No. **1774**. In the dense primitive forests of the

mountain Cungulungulo; branches of a small tree without either fl. or fr., at the foot of a gigantic specimen of *Tetrapleura Thonningii* Benth., Feb. 1855. Native name "Musenze." No. **1775**. A small young tree, 4 ft. high; in dense or open mountainous forests, near the cataract of the river of Capopa and along the roadside near Undelle, never seen in fl. or fr. Dec. 1854, Jan. 1855 and April 1856. Native name "Musenze." No. **1776**. Fr. June 1855. COLL. CARP. 952.

The following two Nos. may be mentioned here, but can scarcely belong to this species:—

GOLUNGO ALTO.—A little tree, 5 ft. high; trunk slender; branches sparse, patent; branchlets and rachis of the leaves ferruginous-hairy; leaves 25-30-jugate; leaflets 45-50-jugate; gland present on the petiole and below every pair of leaflets. Sporadic, along the borders of primitive forests between Sange and Bango-Aquitamba; without either fl. or fr. March 1855. No. **1777**.

BUMBO.—A lofty tree, not uncommonly more than 100 ft. high; 2 to 5 ft. in diam., with prominent angles at the base after the fashion of *Ceiba*. In the dense primitive forests of Serra da Xella; without either fl. or fr. Oct. 1859. No. **1830**.

83. **TETRAPLEURA** Benth.; Benth. & Hook. f. Gen. Pl. i. p. 590.

1. **T. Thonningii** Benth. in Hook. Journ. Bot. iv. p. 345 (1842), cum syn.; Oliv. Fl. Trop. Afr. ii. p. 330; Benth. in Trans. Linn. Soc. xxx. p. 375 (1875).

T. tetraptera Taubert in Bot. Centralbl. xlvii. p. 395 (1891).

GOLUNGO ALTO.—Legumes picked up around the base of a vast tree of about 80 ft. in height, dark purple, very hard, 9 in. long, broadly 4-winged; wings $\frac{5}{8}$ to 1 in. broad, equal, somewhat repand at the edge, roundedly confluent at the apex, thus making the legume obtuse or emarginate, red-brown in the living state. In the elevated primitive woods of Cungulungulo, fr. and seeds only, collected in company with *Piptadenia africana* Hook. (Welw. No. 1775); Feb. 1855. Native name "Muanza." No. **1750** and COLL. CARP. 509. A lofty tree; trunk in old age 5-7-angled near its base; leaflets very thin; legumes a foot long, acutely 4-angled. At the top of the mountain Cungulungulo, near Montalegre; fr. Feb. 1855. COLL. CARP. 522.

ISLAND OF ST. THOMAS.—A middle-sized tree. In the woods of Monte Caffé, about the coffee plantations of Senr. Villars; without either fl. or fr. Dec. 1860. Local name "Cuspira." No. **1835**.

2. **T. andongensis** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 331; Benth., *l.c.*, p. 376.

PUNGO ANDONGO.—Habit of an *Acacia* of the group of *Acacia læta* Br.; leaflets deep-green above, pale beneath. In the more elevated forests at the base of Pedras de Guinga; fr. March 1857. No. **618** and COLL. CARP. 510.

Cf. specimens from the upper course of the river Ninda, an affluent of the Zambesi, collected by Major Serpa Pinto, Nos. 6, 10, in August 1878; Ficalho & Hiern in Trans. Linn. Soc., Ser. ii. Bot., vol. ii. p. 20 (1881).

3. **T. obtusangula** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 331; Benth., *l.c.*, p. 376.

GOLUNGO ALTO.—A tree 25 to 30 ft. high, at the time deprived of its leaves by the burning of the woods; legumes 4 in. long, $1\frac{1}{2}$ in. broad, 1 in. thick, obtusely 4-angled, not winged, gradually narrowed towards

both ends from four-fifths way up. In primitive woods from Bango Aquitamba towards Quilombo Quiacatubia ; fr. Oct. 1855. No. **1751** and Coll. Carp. 511.

84. **DICHROSTACHYS** DC. ; Benth. & Hook. f. Gen. Pl. i. p. 592.

1. **D. nutans** Benth. in Hook. Journ. Bot. iv. p. 353 (1842); Welw. Apont. p. 575, sub n. 176 ; Oliv. Fl. Trop. Afr. ii. p. 333 ; Benth. in Trans. Linn. Soc. xxx. p. 382 (1875).

Dichrostachis (sp.), Welw. Apont. p. 589, n. 66.

Ambriz.—A shrub, 5 ft. high ; leaves 4-5-jugate ; leaflets 17-19-jugate. Sporadic, at the rocky skirts of forests in the region of Mossul, between Libongo and Ambriz, not far from the ocean, above the mouth of the river Onço ; fl. Nov. 1853. No. **1795**.

Loanda, Barra do Bengo, and Icolo e Bengo.—Sometimes a small tree of 10 to 15 ft., at other times a distorted shrub of 3 to 6 ft. ; bark snow-white ; branches tortuous, spiny, divaricate ; flowers very elegant, of an orange-rose colour, nodding. Common, in dry hilly places and in groves of *Adansonia*, etc., occasionally forming dense thickets, around Loanda, Cacuaco, Quicuxe, Boa Vista, Imbondeiro dos Lobos, Foto, Quifandongo, etc. ; fl. Dec. 1853 and July 1854, fr. Oct. 1853, 10 August 1854, Sept. 1857, and Sept. 1860. No. **1796** and Coll. Carp. 512, 513. To this may perhaps belong a specimen cultivated at Lisbon in July 1863 from Angolan seeds. No. **1796***b*.

Pungo Andongo.—A tree, 25 ft. high, with divaricate branches and dilated crown ; pinnæ 7-11-jugate ; leaflets 14-17-jugate. In the less densely wooded places, near Candumba, at the banks of the river Cuanza ; fl. and young fr. March 1857. No. **1799**.

Bumbo.—A much-branched small tree, about 8 ft. high ; pinnæ 5-7-jugate ; leaflets 18-24-jugate ; interjugal glands long-stalked. Sporadic, in thickets near Bumbo, at the foot of the mountains of Serra da Xella ; fl. end of Oct. 1859. No. **1798**.

Var. **setulosa** Welw. ex Oliv., *l.c.*

Huilla.—A divaricately branched arborescent shrub ; pinnæ 10-13-jugate ; leaflets about 20-jugate, pilose and ciliate, with a setulose tip. Sporadic, in hilly shrubby places, near Lopollo, at the foot of Morro de Lopollo ; fl. Feb. 1860. No. **1800**.

Compare with this species the following, without either flower or fruit :—

Zenza do Golungo.—Calumguembo, Sept. 1854. No. **4155**.

2. **D. platycarpa** Welw. Apont. p. 576, sub n. 176 (1859); W. Bull, Retail List, 1866, p. 4 ; Oliv. Fl. Trop. Afr. ii. p. 333 ; Benth , *l.c.*, p. 382.

Golungo Alto.—A slender elegant tree, 10 to 15 ft. high or more, with rambling tortuous elongated spreading branches ; pinnæ of the leaves 16-18-jugate ; leaflets about 22-jugate ; flower-spikes much shorter than the leaves. Not uncommon, in mixed woods along the river Delambŏă, near Sange ; fl. Dec. 1855 and Jan. 1856, fr. Oct. and Nov. 1854-5. No. **1797**. Branches with fully developed leaves, but without either fl. or fr. April 1855, Delamboa. No. **1797***b*. Pods flattened, spirally curved. In mountainous wooded places behind Senr. Perreira's house near Cangueraange ; fr. Nov. 1854. Coll. Carp. 514. A straight tree of 8 to 10, rarely 15 ft., Delamboa, fr. Coll. Carp. 515. In open woods ; fr. 1857. Coll. Carp. 516.

The flowers are produced in pendulous spikes about 1½ in. long, the lower half of which is bright yellow, the other half rose-coloured ; the foliage is of a glaucous green, and the leaves are bi-pinnate, 14 and more jugate ; the leaflets from 26 to 30 pairs ; the legume is nearly an inch broad, and peculiarly twisted (W. Bull, *l.c.*). The species frequently constitutes extensive forests of small height but of singular elegance, mixed with various species of *Acacia* and *Albizzia* ; sometimes it gives a variety of colour to the forests composed of Sterculiaceæ, *Ficus*, and Celtideæ, with its brighter and more glossy foliage, and at other times it constitutes the principal part and gives a characteristic feature to the woods. (Welwitsch, *l.c.*)

The following perhaps belongs to another species of *Dichrostachys* :—

Golungo Alto.—A tree, with slender curved many-seeded brown-black pods constricted in a moniliform manner. In the rocky valleys amongst the mountains of Serra de Alto Queta, in company with the yellow-flowered *Amomum* (Cf. Welw. No. 6456) ; fr. Nov. 1854. Coll. Carp. 520.

85. **NEPTUNIA** Lour. ; Benth. & Hook. f. Gen. Pl. i. p. 592.

1. **N. oleracea** Lour. Fl. Cochinch. p. 654 (1790) ; Oliv. Fl. Trop. Afr. ii. p. 334 ; Benth. in Trans. Linn. Soc. xxx. p. 383 (1875).

Icolo e Bengo.—A decumbent undershrub ; on the slimy bank of the nearly dry lake called Lagôa de Funda, near Funda. Probably this species. No. **1778**.

86. **ACUAN** Medik. Theodor. p. 62 (1786). *Desmanthus* Willd. *ex parte* (1805) ; Benth. & Hook. f. Gen. Pl. i. p. 592.

1. **A. virgatum** Medik. Theodor. p. 62 (1786).

Desmanthus virgatus Willd. Sp. Pl. iv. p. 1047 (1805) ; Schmidt, Beitr. Fl. Cap. Virid. p. 341 (1852) ; Oliv. Fl. Trop. Afr. ii. p. 334 ; Benth. in Trans. Linn. Soc. xxx. p. 385 (1875). *Acuania virgata* O. Kuntze, Rev. Gen. Pl. i. p. 158 (1891).

Ambriz.—A virgate and sensitive undershrub, 2 to 3 ft. high, with rather small whitish and fugacious flowers. Sporadic, by the lake near Banza de Ambriz, amidst masses of *Amaranthus* ; fl. and fr. end of Nov. 1853. No. **1784**.

Cape de Verde Islands.—Frequent in damp thickets behind Villa da Praia, nearly always in the neighbourhood of gardens and cultivated spots ; fl. and fr. Jan. 1861. No. **1785**.

87. **MIMOSA** L. ; Benth. & Hook. f. Gen. Pl. i. p. 593.

1. **M. pigra** L. Cent. Pl. i. p. 13 (1755), Am. Ac. iv. p. 274 (1759).

M. asperata L. Syst. Nat., edit. 10, vol. ii. p. 1312 (1759) ; Oliv. Fl. Trop. Afr. ii. p. 335 ; Benth. in Trans. Linn. Soc. xxx. p. 437 (1875), cum syn.

Ambriz.—A shrub, 4 to 6 ft. high, patently branched, beset with very sharp prickles, constituting very dense thickets penetrable only by lions ; flowers rose-coloured. Common along the banks of the river Quizembo ; in fl. and young fr. Nov. 1853. No. **1790**.

Libongo.—A much-branched diffuse shrub, 3 to 5 ft. high, with heads of rose-coloured or whitish flowers. Common in damp spots at the banks of the river Lifune ; fl. and fr. Sept. 1858. No. **1791**.

Barra do Bengo.—In moist pastures forming very dense thickets by the river Bengo near Panda ; fl. and fr. Dec. 1854. No. **1792**.

Cazengo.—A much-branched shrub, 4 to 6 ft. high, in a cæspitose manner occupying vast tracts. In bushy places at the banks of the stream or small river Moambege, near Dalatanda ; fl. and fr. June 1855. No. **1793**.

Ambaca.—A patently branched shrub, 6 to 8 ft. high, with elongated-virgate almost sarmentose branches. Common along the stream Pamba, near Engombe ; fl. and fr. Oct. 1856. No. **1793***b*.

Pungo Andongo.—A shrub of 3 to 5 ft., with ascending subnatant stems, or with the lower stems submerged; flowers whitish-rose-coloured. Common by marshes and in stagnant pools in company with a species of *Polygonum*, along the banks of the river Cuanza, from Sansamanda to Condo and Umbilla ; in flower-bud Dec. 1856. No. **1794**. An aquatic shrub, branched from the base, with rose-coloured flowers. Common near marshes near Quibanga and at the river Cuanza ; fl. and fr. Jan. and March 1857. No. **1794***b*.

88. **LEUCÆNA** Benth. ; Benth. & Hook. f. Gen. Pl. i. p. 594.

1. **L. glauca** Benth. in Hook. Bot. iv. p. 416 (1842) ; Oliv. Fl. Trop. Afr. ii. p. 337 ; Benth. in Trans. Linn. Soc. xxx. p. 443 (1875).

Bengo.—A small tree, 7 ft. high, with whitish capitate flowers. The specimen mutilated by insects. Apparently an escape from a garden. On the right bank of the river Bengo, near the convent of S. Antonio ; fl. and fr. Dec. 1853. No. **1836**.

89. **ACACIA** Willd. ; Benth. & Hook. f. Gen. Pl. i. p. 594.

1. **A. albida** Del. Fl. Egypte, p. 286, t. 52, f. 3 (1812) ; Oliv. Fl. Trop. Afr. ii. p. 339 ; Benth. in Trans. Linn. Soc. xxx. p. 515 (1875) ; Ficalho, Pl. Uteis, p. 173 (1884).

Prosopis ? Kirkii Oliv., *l.c.*, p. 332.

Mossamedes.—A handsome spiny tree, 20 to 30 ft. high, evergreen in damp situations, rather frondose with a dilated crown ; wood excellent for various building and domestic purposes ; branches even the thicker ones whitish ; flowers pale-yellow, in long spikes. Common in thickets along the banks of the river Bero, at the distance of one and more frequent at the distance of two or three leagues from the coast ; near Cavalheiros, in fl. and fr. July 1859. No. **1824**.

2. **A. Welwitschii** Oliv. Fl. Trop. Afr. ii. p. 341 ; Benth., *l.c.*, p. 517 ; Ficalho, Pl. Uteis, p. 175 (1884).

Ambriz.—A small tree of 10 ft. in height, with quite patent long rambling branches and glaucous-green foliage. In comparatively open small woods, near Quibanza ; fl. Nov. 1853. No. **1804**.

Icolo e Bengo.—At the banks of the river Zenza, *i.e.* Bengo, near Prata ; fl. Sept. 1854. No. **1805**.

Loanda and Barra do Bengo.—A tree from 12 to 20 ft. high, with a lax but very broad crown, and quite patent divaricate-tortuous branches ; flowers at first whitish, soon turning to pale-yellow. In thickets and small woods between Mutollo and Cacuaco, also near Quicuxe ; fr. Oct. 1857, fl. June 1858. Native name "Mubanga" or "Mubango." No. **1806**.

Zenza do Golungo.—A tree, 20 to 25 ft. high ; trunk slender, usually nodose, straight ; branches quite patent, long, chiefly towards

the extremity leafy. Frequent at the banks of the river Calucala, and near Tanderaxique; fr. Sept. 1857. Native name "Mubanga." No. **1805***b*. A tree, 15 to 20 ft. high, with a very spreading crown; branches spiny; flowers racemose-paniculate, turning yellow. At the banks of the river Calucala; fr. Sept. 1857. Coll. Carp. 526.

3. **A. Senegal** Willd. Sp. Pl. iv. p. 1077 (1805); Benth., *l.c.*, p. 516. *A. Verek* Guill. & Perr. Fl. Seneg. p. 245, t. 56 (1833); Oliv. Fl. Trop. Afr. ii. p. 342.

Mossamedes.—A tree, 15 to 20 ft. high or more, with a lax crown; fresh leaves not fully developed at the time of flowering; flowers whitish or yellowish, spicate, precocious; calyx and corolla lepidote-silky; rachis of the spikes dilated (perhaps in consequence of insect-work). At the banks of the river Maiombo, near Pedra da Sola; fl. Oct. 1859. No. **1825**.

This determination is very doubtful; Oliver, *l.c.*, treats the plant as an ally to the above-mentioned species.

4. **A. erubescens** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 343; Benth., *l.c.*, p. 518.

Bumbo.—A small, much-branched tree, 8 to 10 ft. high, copiously producing excellent gum arabic; branches patent, elongated; branchlets flexuous; flowers of a whitish-rose colour when fresh, at length turning pale-yellow in the course of drying. In the high rocky thickets of primitive forests between Bumbo and Bruco, at the base of the mountains of Serra da Xella; fl. and sparingly in foliage Oct. 1859. No. **1826**.

Compare Welwitsch, Synopse, p. 49 n. 132.

5. **A. macrostachya** Reichenb. ex Benth. in Hook. Lond. Journ. Bot. i. p. 511 (1842); Oliv., *l.c.*, p. 343; Benth., *l.c.*, p. 520.

Huilla.—A robust shrub, or perhaps the upgrowth of a mutilated tree; petiolar and interjugal glands thick, dark-purple; flowers spicate, subsessile, turning yellow; calyx campanulate, deeply 5-toothed, with denticulate teeth green in the living state; corolla 5-cleft; petals united at the base up to the top of the calyx; stamens 0, free to the base; ovary shortly ellipsoidal or ovoid, pilose, stipitate; stipes glabrous equalling or longer than the ovary; style elongated; stigma rather truncate. Sparingly in tall thickets between Lopollo and Jâu; fl. beginning of Feb. 1860. No. **1821**.

Considered by Oliver, *l.c.*, p. 344 to belong to the above-cited species, the type of which occurs in Upper Guinea; he notices however certain differences.

6. **A. caffra** Willd. Sp. Pl. iv. p. 1078 (1805); Oliv., *l.c.*, p. 345; Benth., *l.c.*, p. 520.

Loanda.—A much-branched and very frondose tree of moderate size; branches spiny; flowers spicate-paniculate. On dry slopes near Quicuxe; seeds May 1854. Coll. Carp. 101 partly.

Mossamedes.—A tree of moderate size, loosely branched. In gravelly places along the banks of the river Maiombo, which was dry at the time of gathering; fr. Oct. 1859. No. **1823**.

Bumbo.—A small tree, 8 to 15 ft. high (in primitive forests a tree); branches subscandent. In shrubby places near Bumbo at the base of the mountains of Serra da Xella; not uncommon but at the time very rarely flowering; flowers pale-yellow; Oct. 1859. No. **1822**. A tall

tree, with excellent wood ; fr. 16 Oct. 1859 and June 1860. Coll. Carp. 101 partly.

According to Welwitsch the colonial name "Espinheiro preto" probably belongs to this species.

7 **A. pennata** Willd. Sp. Pl. iv. p. 1090 (1805) ; Oliv., *l.c.*, p. 345 ; Benth., *l.c.*, p. 530.

Huilla.—A shrub, 5 to 7 ft. high, with several stems and numerous patent branches, erect ; leaflets thinly serrulate ; flowers snow-white. Very common in comparatively dry bushy hilly places around Lopollo and between Mumpulla and Nene ; fl. from Oct. to Dec. 1859, with ripe fr. Jan. 1860. No. **1820**. A shrub, 5 to 8 ft. high, much branched, spiny ; stems numerous ; flowers congregated in globose heads, white. In thickets ; seeds, Oct. 1859. Coll. Carp. 65. A small tree of 6 to 8 ft., perhaps a young tree, with whitish flowers. Serra da Xella, near Chão de Xella ; fr. 19 Oct. 1859. Called "Muanu." Coll. Carp. 528.

The following variety, defined by Professor Oliver, was regarded by him as not improbably a distinct species :—

Var. **dolichosperma** Oliv., *l.c.* ; Ficalho, Fl. Uteis, p. 175 (1884). *Acacia pentaptera* Welw. Apont. p. 584, n. 8 (1859).

Golungo Alto.—A much-branched sarmentose subscandent shrub, with whitish flowers. In very dense thickets near Ponte de Felix Simões ; fl. and ripe fr. Nov. 1854. No. **1810**. A shrub, 10 to 12 ft. high, very spiny, widely spreading in thickets ; branches almost scandent ; flowers paniculate, whitish. Near Ponte de Felix Simões ; fr. 17 Oct. 1854. Coll. Carp. 519. An arborescent shrub, one of the mightiest of the climbing plants of the primitive forests of this district, about 50 ft. long ; stem 3 in. thick, pentagonal ; flowers yellow. In the primitive forest of Mata de Quibanga, near Sange ; in flower-bud in Dec. 1854, fl. Jan. 1855, young fr. April 1855. No. **1811**.

Pungo Andongo.—An arborescent shrub, decumbent far and widely over the rocks of Cambondo, etc., frequent ; flowers whitish, copious ; near the road to Luxillo ; fl. and ripe fr. Jan. 1857. Native name "Cazembe." No. **1809**. Trunk whitish, acutely pentagonal ; flowers white, very numerous, decking the rocks on which the shrub climbs ; Catete and Mata de Pungo ; seeds Jan. and April 1857. Coll. Carp. 159.

This variety may prove to be a distinct species.

8. **A. farnesiana** Willd. Sp. Pl. iv. p. 1083 (1805) ; Schmidt. Beitr. Fl. Cap. Verd. Ins. p. 342, n. 434 (1852) ; Oliv., *l.c.*, p. 346 ; Benth., *l.c.*, p. 502 ; Ficalho, Pl. Uteis, p. 176 (1884).

Vachellia farnesiana Wight & Arn. Prodr. p. 272 (1834) ; Welw. Apont. p. 575, sub n. 176.

Loanda.—A small tree, 10 to 12 ft. high, with lax branches. At the skirts of the forest on the slopes of Mutullo above Quicuxe ; fl. and fr. April 1858. No. **1807**.

Golungo Alto.—A small tree, 6 to 8 ft. high ; flowers very fragrant. Used by negroes for the preparation of a black dye. Spontaneous and perhaps indigenous, possibly introduced a long time ago ; by thickets near Bango-Aquitamba and other Negro villages ; fl. Oct. 1855. No. **1813**. Legume, pod 3 in. long by $\frac{5}{8}$ broad, Jan. and March 1855. Coll. Carp. 517.

Cape de Verde Islands.—Subspontaneous in thickets about Villa da Praia, in St. Jago ; fl. Jan. 1861. No. **1812**.

The following No., represented by a fragmentary and quite incomplete specimen, should be compared with this species:—

PRINCE'S ISLAND.—A little shrub, 2 ft. high, with a spiny stem; without either fl. or fr. Sept. 1853. No. **1834.**

9. **A. Sieberiana** DC. Prodr. ii. p. 463 (1825); Oliv., *l.c.*, p. 347; Benth., *l.c.*, p. 503; Ficalho, Pl. Uteis, p. 176 (1884); nec Scheele nec Tausch.

AMBRIZ.—A tree, about 20 to 25 ft. high, with a very beautiful dilated crown; spines 2 to 3 in. long, very hard and acute, the older ones quite white; flowers yellowish; heads the size of a pea. In the rather dry thickets on hilly ground covered with a thin coarsely-sandy soil, in company with various Capparideæ; between Ambriz and Mubanga; with fl. and fr. on the same tree, Nov. 1853. No. **1801.** Spines white, very long; seeds, Nov. 1853. COLL. CARP. 518.

CAZENGO.—A tree, 20 ft. high, with irregular rambling divaricate branches; spines and bark whitish. Sporadic, in elevated wooded places, from Serra de Muxaula in the direction of Cacula, with nearly ripe fr. June 1855. No. **1817.**

PUNGO ANDONGO.—A tree, 15 to 30 ft. high, with a depressed-dilated crown; wood whitish, rather hard; flowers whitish. Frequent throughout the district, from the fortress of Pungo Andongo as far as Quisonde; fl. Dec. 1856, in young fr. April 1857. Native name "Mussongue" or "Mussonde." No. **1815.**

The two following Nos. may belong to the same species:—

PUNGO ANDONGO.—Shrubby, 2 to 3 ft. high; branches elongated, very patent, sometimes even decumbent, with white spines. Perhaps a young sterile subglabrous state of the last. Native name "Mussongue." Frequent in all the thickets about the fortress as far as Luxillo; without either fl. or fr. May 1857. No. **1816.**

HUILLA.—A small tree, 6 to 7 ft. high. In the rather dry dense rocky woods, at an elevation of about 4000 ft., on the summit of the mountains of Serra da Xella, *i.e.*, Cume da Xella; with foliage, but without either fl. or fr. Oct. 1859; in company with *Tarchonanthus* (or a plant of this general appearance; cf. Herb. No. 6745). No. **1828.**

The three following Nos. must be compared with this species:—

AMBACA.—A small shrub, 3 to 4 ft. high, with several stems, apparently the upgrowth from the rootstock of a burnt tree. In little woods composed of *Cussonia angolensis* Hiern, between Isange and N-gombe; without either fl. or fr. Oct. 1856. No. **1802.**

GOLUNGO ALTO.—In bushy forests among the mountains of Serra de Alto Queta, on rather barren slopes scattered with flint stones. Spiny branches without either foliage fl. or fr. July 1855. No. **1803.** Flowers yellow?; near Undella, fr. COLL. CARP. 523.

MOSSAMEDES.—A young bush, 5 to 6 ft. high, already much branched from the base; lateral branches 3 ft. long. In sandy thickets at Boca do Bero; without either fl. or fr. July 1859. No. **1831.**

10. **A. reficiens** Wawra in Wawra & Peyr. Sert. Benguel. in Sitz. Ber. Wien, xxxviii. p. 555 (1859); Oliv., *l.c.*, p. 348; Benth., *l.c.*, p. 505 (1875).

MOSSAMEDES.—A robust but low shrub, 3 to 5 ft. high, with numerous divaricate branches from the base; bark whitish; spines two together, recurved, dangerous to travellers; leaves glaucous-green. In sandy-rocky places along the base of the mountains of Serra de Montes

Negros ; fr. 10 and 13 August 1859. Called by the colonists "Unha de Gato" (cat's claw). No. **1818**.

11. **A. robusta** Burch. Trav. Int. S. Afr. ii. p. 442 (1824) ; Oliv., *l.c.*, p. 349 ; Benth., *l.c.*, p. 510.

Huilla.—A tree, 15 to 25 ft. high, with a much-branched dilated crown, and usually laden with brilliant species of *Loranthus* (cf. Welw. No. 4893). Flowers yellow, much crowded, odorous. Not infrequent in mixed woods, in company with species of *Protea*, *Parinari*, *Eugenia*, Combretaceæ, etc., between Lopollo and Monino ; fl. Dec. 1859. No. **1833**.

12. **A. etbaica** Schweinf. in Linnæa, xxxv. p. 330, tt. 7, 8 (1868) ; Oliv., *l.c.*, p. 349 ; Benth., *l.c.*, p. 510 ; Ficalho, Pl. Uteis, p. 176 (1884).

Benguella.—A tree, 12 to 20 ft. high, much branched from the base ; branches elongated-tortuous, very patent ; flowers in heads, yellow. It was reported to Welwitsch that excellent gum-arabic is produced by this tree. Frequent in bushy places around the city of Benguella, towards the east and near the then dry river Cacuaco ; in late fl. and in fr. end of June 1859. No. **1819**.

13. **A. tristis** Welw. ex Oliv., *l.c.*, p. 349 ; Benth., *l.c.*, p. 510.

Huilla.—A tree, 15 to 20 ft. high, wholly of a gloomy grey colour. In rather dry hilly spots between Lopollo and a place called Ferrão da Sola ; fr. Jan. 1860. Spines short. No. **1829**. A tree, 8 to 12 ft. high ; branches rambling, elongated ; flowers yellowish. On the highest ridge of the mountains of Serra da Xella, near Mumpulla ; a single branchlet in fl. Oct. 1859, in company with *Tarchonanthus*. No. **1832**.

14. **A. arabica** Willd. Sp. Pl. iv. p. 1085 (1805) ; Oliv., *l.c.*, p. 350 ; Benth., *l.c.*, p. 506.

Bumbo.—A moderate-sized tree of 20 to 25 ft., sometimes a very elegant bush of 10 to 15 ft. branched from the base ; flowers pale-yellowish. In rocky places at the skirts of woods between Quitive de Cima and Bumbo, in company with "Mutuate" (*Copaiba Mopane* O. Kuntze) ; fl. Oct. 1859. No. **1827**.

15. **A. andongensis** Welw. ms.

Acacia (sp.), Oliv. Fl. Trop. Afr. ii. p. 353.

A tree, 20 to 25 ft. high ; branches elongated-patent ; crown dilated ; branchlets very spiny : legumes oblong-linear, usually variously sinuous, flattened, chestnut-purple, afterwards turning dark-red.

Pungo Andongo.—On rather damp sandy declivities, also in very dry places, along the banks of the river Cuanza, near Sansamanda, in company with "Muçoso" (? *Gigalobium abyssinicum*) ; in young fr. Feb. 1857. No. **1814**.

The material does not suffice for the complete determination of the specimen ; Oliver, *l.c.*, regarded it as related to *A. caffra* Willd.

90. **ALBIZZIA** Durazz. ; Benth. & Hook. f. Gen. Pl. i. p. 596.

1. **A. anthelmintica** Brongn. in Bull. Soc. Hort. Fr. vii. p. 902 (1860) ; Oliv. Fl. Trop. Afr. ii. p. 357 ; Benth. in Trans. Linn. Soc. xxx. p. 564 (1875) ; Ficalho, Pl. Uteis, p. 177 (1884).

Feuilleea anthelmintica O. Kuntze, Rev. Gen. Pl. p. 187 (1891).

Bumbo.—A shrub of 6 to 7 ft., or perhaps a young tree, with virgate erect-patent branches and branchlets; leaves glaucescent, 2-3-jugate; pinnæ 2-4-jugate; leaflets obliquely obovate-oblong; rachis somewhat pilose; petiolar and jugal glands conspicuous; flowers ample, capitate, whitish or of a pale sulphur colour; calyx and corolla long-tubular, glabrescent; corolla-lobes cucullate at the apex, and there glandular; stamens about an inch long, twice as long as the corolla, connate in a tube at the throat of the corolla; legumes flat, 6 in. long, $\frac{3}{4}$ in. broad, narrowed at both ends, sinuous-constricted on both edges between the seeds, glabrescent. Rather rare, in thickets of primitive forests of the mountains of Chão de Xella, at an elevation of 2500 to 3000 ft.; fl. and fr. Oct. 1859. No. **1759**.

2. **A. latifolia** Boivin in Encycl. xix. Siècl. ii. p. 33 (1842).

A. Lebbek Benth. in Hook. Lond. Journ. Bot. iii. p. 87 (1844); Oliv., *l.c.*, p. 358; Benth., *l.c.*, p. 562.

Feuilleea Lebbek O. Kuntze, *l.c.*, i. p. 188.

Loanda.—A young tree, 12 to 15 ft. high, cultivated at Loanda in Feb. 1859 (also at Lisbon in 1862) from seeds formerly introduced into the garden of Dr. Mendes Alfonso from Zanzibar island. Leaves glaucous beneath; petiolar and jugal glands abundant; stamens monadelphous, whitish below, yellowish-green above as are also the calyx and corolla. No. **1789** (excl. semin.).

The seeds associated with this No. perhaps belong to *Gleditsia africana*.

The following No. perhaps belongs to *A. latifolia*:—

Huilla.—A small tree, with pendulous branches and a reddish bark. In the forest of Monino; without either fl. or fr. Nov. 1859 and Jan. 1860. No. **616**.

3. **A. versicolor** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 359; Benth., *l.c.*, p. 562.

Feuilleea versicolor O. Kuntze, *l.c.*, p. 189.

Golungo Alto.—A handsome tree, 15 to 35 ft. high, with a broad crown and patent branches, the lower branches and branchlets horizontal; half evergreen, exuding a blood-red gum; leaflets 3-6-jugate; calyx usually 5- sometimes 7-toothed; teeth subequal; corolla whitish; anthers yellow; legumes $1\frac{1}{2}$ to 2 in. broad. Not uncommon in the less dense (secondary) woods between Sange and the river Luinha, about Cambondo, Trombeta, and Muria, and in the woods of Serrado de Bumba; fl. Nov. 1855, fr. Sept. and end of Dec. 1854. Roadway towards Mussengue; fr. (called "Mufufutu") June 1856. No. **1760**. A lofty tree, often quite covered with cherry-red gum; leaves bipinnate; leaflets broad-elliptical, silky-ferruginous; legumes very broad. At the cross-roads; fr. Coll. Carp. 531.

Zenza do Golungo.—By thickets near Calumguembo; fl. Jan. 1855, in old fr. Sept. 1854. No. **1761**.

The name "Mufufutu" is also applied by the natives to *A. angolensis* Welw. (Nos. 1766, 1767).

4. **A. coriaria** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 360; Benth., *l.c.*, p. 564; Ficalho, Pl. Uteis, p. 177 (1884).

Feuilleea coriaria O. Kuntze, *l.c.*, p. 187.

Golungo Alto.—A very elegant tree, 20 to 35 ft. high, with dilated but not dense crown: bark gummy, very astringent; common petiole with a large gland vertically seated on it; leaflets glaucescent beneath;

flowers very prettily purple-red ; calyx greenish-yellow ; corolla pale sulphur-yellow ; filaments white half way up from the base, bright blood-red towards the apex. Sporadic in the roadway near Mussengue, fl. Jan. 1855 ; in the forests by Zengas do Queta, fr. Nov. 1855 ; frequent at the margins of primitive forests on the sides of the mountains of Serra de Alto Queta, at Mariano Arimo, fl. 28 March 1856. No. **1762**. A tree, 15 to 25 ft. high, with spreading branches ; two kinds of indumentum on the petioles. In secondary woods between Cambondo and Trombeta ; in leaf without fl. June 1855. No. **1764**. A tree, 25 ft. high ; leaflets glabrous and glaucescent beneath, about 9-jugate ; long-stalked glands interposed amongst the soft short pilose hairs of the common petiole. By the skirts of the primitive forests by the roadside of Mussengue ; with young foliage and in fr. Dec. 1855. No. **1764***b*. A small tree, 10 ft. high ; trunk 2 in. in diam. In wooded places by the stream Quiapoze near Sange ; in leaf without either fl. or fr. Feb. 1855. No. **1765**.

Cazengo.—A small tree 12 ft. high in fl., and mostly 15 to 20 ft. high in fr. In the forests at the banks of the river Luinha, June 1855. No. **1763**.

The bark of this tree, which the negroes of Golungo Alto call "Muzuembe" or "Musuemba," "Mozuemba" or "Mozemba," is universally and with great success used for tanning leather. See Welw. Synopse, p. 33, n. 81.

5. **A. angolensis** Welw. ex Oliv., *l.c.*, p. 360 ; Benth., *l.c.*, p. 564 ; Ficalho, Pl. Uteis, p. 178 (1884).

Feuilleea angolensis, *l.c.*, p. 187.

Golungo Alto.—A vast tall tree, 30 to 40 ft. high, with the habit of the section Zygia ; trunk 1 to 2½ ft. diam., straight below, then divided into long patent cymosely arranged branches in a fastigiate manner ; leaflets hardly ever more than 13-jugate ; flowers very crowded, from whitish to yellowish ; the central flower in the head male and without the rudiment of an ovary, the remaining flowers two or three times as large ; calyx greenish, with brownish teeth ; corolla sulphur-yellow as are also the stamens which latter however towards the apex are bright-green ; anthers very small. Very abundant in the primitive forests of the mountains of Serra de Alto Queta, Cungulungulo, Mussengue, etc. ; fl. from Dec. 1855 to March 1856 ; Guengue de Queta, 21 March 1856. No. **1766**. In mountainous stations along the roadside which leads in the direction of Mussengue ; the fr. probably of the above species, June 1856. No. **1766***b*. A tree, with the habit of an *Acacia*. Alt. 2300 ft. ; fr. Coll. Carp. 525. A tree of 30 to 45 ft., with an ample crown ; bark brownish, rough, very gummy. In the woods of Sobato de Bumba, in a narrow valley ; in leaf without fl. and with fr. April 1855 (with old foliage in Sept. 1855). No. **1767**.

Zenza do Golungo.—A tree of 35 to 40 ft., with patent branches and horizontally spreading branchlets. On wooded declivities near the mountains of Mongolo and Muxáo, in leaf and fl. (the flowering specimens lost by Welwitsch) Sept. 1854. Apparently belonging to the same species. No. **1768**.

Called by the natives "Mufufutu" or "Mufufuto," a name which they also apply to *A. versicolor* Welw. (No. 1760). Welwitsch in Synopse, p. 9, nn. 10, 11, states that the wood of the tree is white on the outside and variegated in the middle, and is well adapted for joiners' work.

6. **A. fastigiata** Oliv. Fl. Trop. Afr. ii. p. 361; Benth., *l.c.*, p. 570.
Feuilleea Sassa O. Kuntze, *l.c.*, p. 186.

Golungo Alto.—A tree, 20 to 30 ft. high, with fastigiate branches and dilated umbrella-shaped crown; flowers whitish. Common in the more elevated forests of Serra de Alto Queta; in young fr. June 1856; Zengas, with fl. and ripe fr. on the same tree, 18 Sept. 1856. No. **1769**. A tree, 20 to 25 ft. high; branches dichotomous, fastigiate, the upper ones as well as the branchlets sub-horizontal; crown umbrella-shaped; leaves not uncommonly 8-jugate; leaflets somewhat pilose also on the upper surface; jugal glands always present between the last 3 to 5 pairs of leaflets; corolla white; stamens of the central flower of each head white, those of the outer flowers green. On wooded mountainous declivities, near Canguerasange, at Arimo do Senr. Mariano; fl. Sept. 1856, Dec. 1854 and August 1856. No. **1769***b*. An elegant tree; abundant in forests near Sange; fr. July 1855. Coll. Carp. 527.

7. **A. Brownei** Oliv. Fl. Trop. Afr. ii. p. 362; Benth., *l.c.*, p. 569.
Feuilleea Zygia O. Kuntze, *l.c.*, p. 187 (1891).

Golungo Alto.—A shrub of 5 to 7 ft., perhaps becoming a tree; leaflets whitish-glaucous. In the denser woods, near the cataract of the river Cuango, not far from Sange, with foliage without either fl. or fr. beginning of August 1855. No. **1772**. A small mutilated shrub, 5 ft. high, with a little trunk scarcely 1½ in. thick and leafless branches bearing young fl.; in the same spot as No. 1772 and perhaps belonging to the same species; Sept. 1856. No. **1772***b*. A tree 25 ft. high, branched in a fastigiate manner. Sporadic, in the primitive forests of Mata de Quibanga, near Sange, where *Morus excelsa* Welw. No. 1559 was first seen in flower by Welwitsch; in leaf without either fl. or fr. Dec. 1855. Perhaps the same species as Nos. 1772 and 1772*b*. No. **1773**.
These three determinations are doubtful.

8. **A. Welwitschii** Oliv. Fl. Trop. Afr. ii. p. 362; Benth., *l.c.*, p. 569; Ficalho, Pl. Uteis, p. 178 (1884).
Feuilleea Welwitschii O. Kuntze, *l.c.*, p. 189.

Golungo Alto.—A lofty tree, 20 to 30 ft. high or more, usually 40 to 45 ft. high; branches patent, ascending-fastigiate; crown truncate-dilated at the top; wood durable; flowers yellow-greenish or from whitish to pale straw-coloured; the central flower of each head (as in all the species of the section *Zygia*) always sterile and different in form from the rest. Very abundant in the mountainous forests of the whole district, distinguishable from afar by the singular obconical shape of the crown; at Trombeta, Cungulungulo, Bumba, and Sange; fl. Nov. 1854 and Jan., fr. Oct. 1854 and August 1856 (at Zengas do Queta); nearly always either in fl. or fr. Native name "Muanze." No. **1770**.

Pungo Andongo.—A tree, 20 ft. high; crown fastigiate, dilated in the form of an umbrella; branchlets and petioles densely puberulous; the extreme leaflets the largest; flowers whitish. Sporadic, in small open rocky woods on the north side of the fortress of Pungo Andongo; fl. Dec. 1856. No. **1771**.

The last No. (1771), of which no flowers were separated for the British Museum, seems to approach *A. fastigiata* Oliv.

This is apparently the tree referred to by Welwitsch in Synopse, p. 14, n. 34 and p. 36, n. 98, under the name of "Muance," which he describes as a species of *Zygia* and one of the most abundant constituents of the virgin forests of the district of Golungo Alto; its

wood is very light and rather smooth, and presents at times purple or rose-coloured veins in the centre of the trunk. The name is also applied to *Acacia pennata* Willd. and *Albizzia fastigiata* Oliv.

The following three Nos. apparently belong to Leguminosæ, sub-order Papilionaceæ; the first is poorly represented in the British Museum set, and the two latter seem to belong to a species of a genus allied to *Amerimnon*:—

Huilla.—Style glabrous, tumid at the base; keel blunt. Cf. *Shuteria* (Baker ms. in Herb. Welw.). Peduncles elongated and fasciculate. In wooded thickets at Mumpulla; fl. Oct. 1859. No. **4125**.

Golungo Alto.—A young tree of 8 ft. or of 15 to 20 ft.; branches erect-patent, rigid; branchlets somewhat pendulous; leaves irregularly pinnate, sometimes simple or reduced to the last leaflet, dry-coriaceous, very rigid, quite glabrous; leaflets alternate, thick but not fleshy, very large, delicately veined, veinlets anastomosing in a rectangular manner, spaces between the veinlets more or less square, obscurely pellucid-punctate, margins broadly cartilaginous. Sporadic, in primitive forests near the spring of Quibôlo in Serra de Alto Queta; always without either fl. or fr. Feb., March, June and August 1856. No. **1887**.

Cazengo.—Sent from Caculo by Senr. Candido under the name of "Mubafo," but it is not the true Mubafo which is *Canarium edule* Hook. f. (Welw. No. 4483); leafy branch of a tree much damaged by insects, July 1855. No. **1887***b*.

XLV. ROSACEÆ.

The comparative scarcity of this Order in Western Tropical Africa, which had been previously commented on, was entirely confirmed by Welwitsch's careful investigations in Angola. The plant producing the pigeon plum of Afzelius, called "Jingimo" or "Jinginvo" by the natives, grows abundantly along the coast, sometimes in the form of a low bush as in Mossul and Ambriz, and sometimes it is a small elegant tree as in the islands of Loanda and Cazanga; the fresh leaves abound in an astringent substance; the ripe fruit reaches the size of a small tangerine orange and is reddish-purple or black-purple, and also slightly succulent and somewhat astringent; there is, however, a yellow variety. A rose, probably a variety of *Rosa gallica* L., is cultivated in the gardens and fields of the colonists in many parts of the province; it does not much enjoy the coast region, but thrives fairly well in the hilly region and perfectly in the highlands, especially on the confines of Pungo Andongo. Welwitsch recommended the introduction of the Abyssinian tree, *Hagenia abyssinica* Gmel., called "Cusso" or "Cabotz," of which an infusion of the flowers furnishes a sure remedy in cases of tape-worm; he also recommended the cultivation of the strawberry (morangos) on the banks of the rivers Bengo and Dande in the coast region and in moist fields and shady places in the hilly and highland regions; and the introduction, especially by the rivers Bengo and Dande, of the Brazilian tree *Licania floribunda* Benth., the fruit of which is much valued for dessert and is called "Guiti" or "Oiti" by the Brazilians.

1. **CHRYSOBALANUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 606.

1. **C. Icaco** L. Sp. Pl. edit. 1, p. 513 (1753); Br. in Tuckey, Congo, pp. 434, 467, 469, 480 (1818); Welw. Apont. pp. 572 under n. 173, 585, n. 19; Oliv. Fl. Trop. Afr. ii. p. 365; Monteiro, Angola, ii. p. 298 (1875); Ficalho, Pl. Uteis, p. 178 (1884).

C. luteus Sabine in Trans. Hort. Soc. Lond. v. p. 453 (1824); Welw. Apont. p. 572.

Ambriz.—A shrub with a Sapotaceous aspect, 2 to 8 ft. high, or in stony places lower and cæspitose or even dwarf; in moist seaside places 6 to 8 ft. high and erect, much branched and densely leafy. Leaves hard-coriaceous, glossy, evergreen, bright-green. Flowers whitish; stamens about 20, filaments patently hirsute. Fruit apple-shaped, the size of a small tangerine orange, when ripe rather smooth outside greenish- or yellowish-red, eaten by the negroes, acid-sweet, subastringent, but little juicy. Native names "Jingimo," "N-gimo." A decoction of the leaves and also the freshly expressed juice serve sea fishermen for staining their nets brown and at the same time for preserving them from decay. Frequent in rocky or sandy parts of the sea-coast, not rarely in company with *Rhizophora*, near Ambriz, Quisembo, Mossul, etc.; fl. and ripe fr. at Ambriz, Nov. 1853. No. **1291**.

Loanda and Barra do Dande.—An evergreen shrub of 3 to 5 ft., rarely a small tree of 8 to 10 ft. or more; flowers white; fruit red-green or yellow. Frequent in bushy sandy places near the city of Loanda, especially in the island of Cazanga where it is a small tree of 10 to 12 ft. with edible, pomiform, purplish or red- to greenish-yellow fruit; fl. and ripe fr. March and Sept. 1858. No. **1290**. A shrub, rarely arborescent; at the coast near Loanda; fr. Coll. Carp. 541.

Benguella.—A shrub of 2 to 4 ft. At the sandy sea-coast between the city of Benguella and the river Catumbella; with unripe fr. in June 1859; not introduced as indicated by Wawra and Peyritsch, Sert. Benguel. in Sitz. Ber. Wien, xxxviii. p. 552 (1859). No. **1292**.

2. **C. ellipticus** Soland. ex Sabine in Trans. Hort. Soc. Lond. v. p. 453 (1824); Oliv. Fl. Trop. Afr. ii. p. 366.

Pungo Andongo.—A tree, 15 to 25 ft. high; crown dilated; branches and branchlets erect-patent; flower-buds whitish. Sporadic, along the banks of the river Cuanza between Condo and Quisonde, at a distance of 300 miles from the ocean; also near Candumba; in flower-bud March 1857. No. **1236**.

2. **PARINARI** Aubl. Guin. Pl. i. p. 514. tt. 204, 205, 206 (1775); Benth. & Hook. f. Gen. Pl. i. p. 607 (*Parinarium*).

1. **P. excelsa** Sabine in Trans. Hort. Soc. Lond. v. p. 451 (1824) (*Parinarium excelsum*); Oliv. Fl. Trop. Afr. ii. p. 367.

Griffonia (sp.), Miers in Journ. Linn. Soc. xvii. p. 337 (1879). *Ferolia excelsa* O. Kuntze, Rev. Gen. Pl. i. p. 216 (1891).

Sierra Leone.—A low shrub, 1 to 3 ft. high, with numerous stems from a creeping rootstock, quasi-cæspitose, very rigid in all parts. In the more elevated and rather dry bushy mountainous places, near Freetown; without either fl. or fr. Sept. 1853. No. **1284**. A specimen from G. Don's herbarium collected by him near Freetown; "the country plum of Sierra Leone; one of the largest trees." No. **1284***b*.

With this species must be compared the following No.:—

Pungo Andongo.—A tree 20 to 30 ft. high, divaricately branched at

the apex, with a dilated crown ; foliage with somewhat the habit of *Castanea sativa* Mill., but with a poorer and drier aspect. Flowers not seen. Fruit of the size of a small hen's egg, at first very hard, softening at last, edible. In elevated rocky places among the mountains of the fortified region of Pungo Andongo, at a spot called Pedra de Cazella ; with leaves without fl. Dec. 1856 and May 1857. Native name "Nichia." No. **1287**.

2. **P. Mobola** Oliv. Fl. Trop. Afr. ii. p. 368 (*Parinarium*) ; Hook f. Rep. Kew, 1877, p. 35 (1878) ; Ficalho, Pl. Uteis, p. 178 (1884). *Ferolia Mobola* O. Kuntze, Rev. Gen. Pl. i. p. 216 (1891).

Pungo Andongo.—A tree, 15 to 25 ft. high, with rather lax crown, divaricate tortuous branches, and edible fruit. In the more elevated and open rocky mountainous parts of the fortified region of Pungo Andongo, between Cazella and Caghuy, sparingly ; in young fr. Jan. 1857. No. **1288**.

Huilla.—A very handsome tree, 20 to 40 ft. high, variable in stature and height according to the quality of the soil and degree of exposure ; trunk 1 to 3 rarely $3\frac{1}{2}$ to 4 ft. in diam. at the base, dichotomously and tortuously branched at 3 to 5 ft. above the base ; crown dilated, depressed-hemispherical, 60 to 100 ft. in diam. in the case of trees with a trunk of 3 ft. in diam. ; leaves coriaceous, evergreen, very rigid ; petiole thick, short, fleshy, articulated with the branchlet ; flowers whitish ; fruit edible, very agreeable, vinous-farinaceous, pulpy, as if made up of honey and meal, drupaceous, 2-seeded, ferruginous-brown outside, furfuraceous-rough, of the size of a hen's egg more or less, elliptic-obovoid or -clavate ; seeds loosely wrapped in tawny wool ; sarcocarp small in quantity in proportion to the size of the seeds. Abundant and forming extensive forests together with species of *Protea* and Myrtaceæ, throughout the more elevated (5,000 to 5,500 ft.) mountainous parts of Morro de Lopollo ; fl. Oct. 1859 ; the fruits begin to ripen in the middle of October and last nearly to the end of January, some trees even supply palatable fruit in February. Native name "Nocha" (Noscha) or "Noxa." No. **1282** and Coll. Carp. 1.

This tree constitutes one of the principal elements of the extensive and varied forests of the high plateau of Huilla, being without question one of the most handsome and useful trees of all the Huilla district ; it rises to the height of 25 to 40 ft. and more, with a diam. of 2 to $3\frac{1}{2}$ ft. in its trunk at the base, and affects nourishing and sandy soils, especially along streams ; its crown is broad and its ramification quasi-horizontal, and its foliage is evergreen, dense, and, on account of the deep green colour of its leaves above and snow-white beneath, of extraordinary effect. The wood of the Noxa is generally employed in Huilla for the manufacture of furniture and other domestic utensils, and when properly seasoned furnishes good boarding. But what is most advantageous in this tree is its fruit, since at the time of its ripening a large proportion of the native population are sustained almost exclusively on Noxas, and so great is the abundance of these fruits in the neighbourhood of the provinces of Lopollo and Humpata that the natives offer large baskets of them to the European colonists at the price of 25 to 100 milreis ($1\frac{1}{4}d.$ to $5d.$) for a hundred fruits ; the fruits are of the size of a small peach, containing the bulky stone wrapped in a farinaceous-pulpy mass, sweet and of a very agreeable aroma. (See Welwitsch, Synopse, p. 18, n. 43.)

The Nocha is the most abundant and appreciated wild fruit in the whole of the district of Huilla ; it is a large tree, evergreen and of

magnificent habit, and the small almond-like fruits, which contain the stones, are eatable and even very relishing; it does not appear to be unwholesome, since both the natives and the white colonists consume at the proper season enormous quantities of the Nochas without the least disturbance to their health. (See Welwitsch, *l.c.*, p. 52, n. 140.)

3. **P. capensis** Harv. in Harv. et Sond. Fl. Cap. ii. p. 597 (1862) (*Parinarium capense*); Oliv. Fl. Trop. Afr. ii. p. 368; Ficalho, *l.c.*, p. 179.

Ferolia capensis O. Kuntze, Rev. Gen. Pl. i. p. 216 (1891).

HUILLA.—A dwarf shrub, 2 to 4 in. high, rarely 5 to 12 in. high, densely and widely cæspitose, covering extensive tracts of shortly-bushy pasture-lands which are annually burnt; leaves narrow; flowers white; fruits rare, less commonly eaten than the other species, not altogether unpleasant. Frequent in sandy thickets between Mumpulla and Humpata; fl. Oct. 1859. Possibly a diminutive form, or a fresh growth from a destroyed trunk of *P. Mobola* Oliv. No. **1283**.

Var. **latifolia** (Oliv., *l.c.*, p. 369).

CAZENGO.—A shrub, 1 to 2½ ft. high; stems densely cæspitose, after the fashion of the Portuguese *Quercus humilis* Lam.; flowers white. Abundant on the dry hills on the left bank of the river Caringa near Dalatanda; in early fl. and young fr. June 1855. Native name "Gihia" or rather "Guihia." No. **1286**. Cazengo, very rarely in Golungo Alto; fr. COLL. CARP. 540.

AMBACA.—A dwarf shrub, 1 to 1½ ft. high, growing in a cæspitose manner, occupying in dense crowds extensive dry hilly tracts, very rigid; flowers pentamerous; fruit drupaceous, of the size and shape of a pigeon's egg, eaten by the natives. Frequent, on bushy schist-sandy hills between Cabinda and Izanga; fl. and young fr. Oct. 1856. No. **1285**.

Except that it is a dwarf shrub instead of a tree, it is difficult to distinguish the variety from *P. curatellæfolia* (*Parinarium curatellæfolium* Planch. in Hook. Niger Fl. p. 333).

3. **ACIOA** Aublet, Hist. Pl. Guian. ii. p. 698, t. 280 (1775). *Dactyladenia* Welw. Apont. p. 572 under n. 173. *Griffonia* Hook. f. in Benth. & Hook. f. Gen. Pl. i. p. 608; non Baill.

1. **A. Bellayana** Baill. in Adansonia, vii. p. 224 in note (1867). *Dactyladenia floribunda* Welw. Apont. p. 572. *Griffonia Bellayana* Oliv. Fl. Trop. Afr. ii. p. 371.

GOLUNGO ALTO.—A beautiful tree, 15 to 25 ft. high, rarely higher, or in secondary woods a little tree of 12 to 15 ft.; trunk at the base 1 to 1⅓ ft. in diam., straight; branches patent, slender; branchlets rather nodding, shortly ferruginous-hirsute-tomentose; bark somewhat warty; crown ovoid-dilated, rather lax; leaves thinly coriaceous, but little shining, evergreen or rather at the time of the inflorescence caducous but at the same time with fresh leaves arising at the extremities of the branchlets; corymbs of flowers in the axils of the leaves on horizontal branchlets, erect, centripetal in flowering; calyx long-tubular, green; tube gradually attenuated downwards, gibbous at the base on one side, turbinate, articulated with the pedicel and there enveloped by 2 opposite palmatipartite bracteoles; all the segments of the involucre terminated at the apex by oblong turgid reddish-brown glands; calyx-limb 5-partite; petals 5, milk-white, inserted on the throat of the calyx, often unequal among themselves, very shortly clawed, concave, imbricate in æstivation, caducous; stamens perfectly unilateral, in the bud

spirally twisted together with the style, inserted on the throat of the calyx, at the dorsal side of the base of the style, represented on the other (opposite) side only by a little-elevated disk crenate-dentate at the margin; filaments about 20 to 25, all fertile, more than an inch long, connate high up into a semicylinder which includes the style after the manner of Leguminosæ, almost resembling in this respect the flowers of *Albizzia*; anthers nearly orbicular, emarginate at both ends, dorsi-fixed in the middle, 2-celled; cells reniform green. Between the ovary and stamens is a beard of straight hairs; disk also pilose with depressed hairs declinate towards the ovary; style lateral, not basal. Sporadic, in the dense primitive forests of Serra de Queta Central (Zengas), very rarely in secondary woods: fl. 23 Sept. 1856 and again at the end of July 1857; in flower-bud July 1856. No. **1289**. In the primitive forests of the slopes of the mountains of Queta, very rare; in young fr. end of Nov. 1855. No. **1289***b*.

4. **PYGEUM** Gaertn.; Benth. & Hook. f. Gen. Pl. i. p. 610.

1. **P. africanum** Hook. f. in Journ. Linn. Soc. vii. p. 191 (1864); Oliv. Fl. Trop. Afr. ii. p. 373.

Pungo Andongo.—A lofty tree, 50 to 80 ft. high; branches rambling; crown dilated upwards; leaves coriaceous, shining, pellucidly veined, glandular at the serratures. The leaves as well as the fruits abound in prussic acid, and the kernels are similar in taste to those of bitter almonds only richer in substance; a decoction of the leaves mixed with milk furnishes an excellent substitute for almond-milk. Fruits obcordate-bilobed, 1-seeded. Sporadic, in the moist sandy forests between Luxillo and the fortress of Pungo Andongo; in young fr. May 1857. No. **465**.

5. **RUBUS** L.; Benth. & Hook. f. Gen. Pl. i. p. 616.

1. **R. pinnatus** Willd. Sp. Pl. ii. p. 1081 (1799); Oliv. Fl. Trop. Afr. ii. p. 374; Ficalho, Pl. Uteis, p. 179 (1884).

R. apetalus Welw. Apont. p. 571; Hook. f. in Journ. Linn. Soc. vi. p. 9 (var.) (1861), vii. p. 191 (1864); vix Poir.

Golungo Alto.—A shrub, highly sarmentose, widely climbing, always and constantly apetalous; stems numerous; calyx-segments ovate, tomentose, subulate-acuminate at the apex. Carpels obliquely ovoid-conical; style sublateral, cylindrical, truncate at the apex; receptacle sub-hemispherical. Not in small quantity (but seen in one station only) in the ascent of the mountains of Sobato Quilombo Quiacatubia; in fl. and young fr. Feb. 1855. Native name "Musuno." No. **1280**.

An infusion or slight decoction of this plant is employed by the negroes as an efficacious gargle in cases of quinsy. I have followed Professor Oliver in the determination of this plant; the species is united with *Rubus rosæfolius*, Sm. Pl. Ic. Ined. iii. t. 60 (1791), by Sir J. D. Hooker in his Flora of British India, vol. ii. p. 341 (1878).

2. **R. huillensis** Welw. ex Oliv. Fl. Trop. Afr. ii. p. 375.

R. rigidus Oliv., *l.c.*, p. 375, vix Sm.

A shrub, 3 to 6 ft. high, with numerous long trailing stems; branches elongated, subterete and thinly pubescent below, obtusely angular and with whitish-grey felt and small sessile glands towards the extremities; prickles decurved or hooked, from a rather long base subulate, of a pale-chestnut colour, thinly pubescent on the lower part, glabrous in the upper part, $\frac{1}{12}$ to $\frac{1}{6}$ in. long; stipules

linear-subulate, pubescent, $\frac{3}{8}$ to $\frac{1}{2}$ in. long, persistent; leaves mostly trifoliolate, rarely and exceptionally quinquefoliolate, pinnate or the upper ones unifoliolate, $3\frac{1}{2}$ to 5 in. long; petiole (below the leaflets) ranging up to 1 in. long or rather more, with whitish-grey felt and usually with small prickles; lateral petiolules very short, $\frac{1}{20}$ to $\frac{1}{15}$ in.; terminal petiolule ranging up to $\frac{2}{3}$ in. long, with felt and sometimes prickly; terminal leaflet ovate or sub-oval, rather shortly acute or subacuminate at the apex, nearly rounded or subcordate at the base, bidentate or irregularly toothed, deep green and subglabrate on the upper surface, with whitish-grey felt beneath, flat, rather thickly membranous, $2\frac{1}{4}$ to 3 in. long by $1\frac{1}{2}$ to 3 in. broad, teeth broadly ovate, apiculate; lateral leaflets rather unequal-sided, $1\frac{1}{4}$ to $2\frac{1}{2}$ in. long by $\frac{2}{3}$ to $1\frac{2}{3}$ in. broad; panicles pyramidal-oblong, terminal, prickly, 3 to 6 in. long, somewhat leafy in the lower part, bracteate above, clothed with whitish-grey felt; bracts sub-linear or broader in the middle, ranging up to $\frac{2}{3}$ in. long; pedicels ranging up to $\frac{1}{2}$ in. long, often prickly; flowers numerous, hemispherical, $\frac{1}{2}$ in. diam.; calyx pubescent, woolly and somewhat prickly outside, clothed within with short whitish felt, lobes oval, $\frac{1}{5}$ in. long, glandular outside, tipped with a rather long dark thinly pubescent mucro; petals broadly obovate, rounded at the apex, sub-unguiculate at the base, $\frac{1}{5}$ in. long, veiny, of a deep-rose colour, upper margin minutely denticulate; filaments unequal, slightly tapering upwards, falling short of the head of pistils; styles somewhat hairy, longer than the rest of the ovary; head of fruiting carpels globose, $\frac{1}{2}$ in. diam.; fruit black-purple or black-reddish, edible but rather dry; drupels glabrous, scrobiculate when dry; fruiting calyx applied to the base of the fruit.

HUILLA.—Not uncommon in bushy places along the Lopollo river and in Serra de Oiahoia near Humpata, at an elevation of from 4000 to 6000 ft.; frequently in company with *Cliffortia linearifolia* Eckl. & Zeyh.; fl. Oct., fr. Nov. and Dec. 1859 and April 1860. No. **1281**.

6. **CLIFFORTIA** L.; Benth. & Hook. f. Gen. Pl. i. p. 624.

1 **C. linearifolia** Eckl. & Zeyh. Enum. Pl. Afr. Austr. p. 270, n. 1749 (1836); Oliv. Fl. Trop. Afr. ii. p. 379.

HUILLA.—A shrub, 4 to 7 ft. high, with the habit of *Erica arborea* L., branched from the base; branches inconspicuously and branchlets shortly whitish-brown-tomentose; leaves in alternate fascicles, coriaceous, persistent, digitately 3-1-foliolate, stipulate, shortly petiolate; leaflets linear-needleshaped, rather obtusely pointed, abruptly and minutely apiculate, convex on the upper surface, 1-furrowed beneath, pale-green, $\frac{1}{6}$ to $\frac{1}{2}$ in. long; stipules combined with the petiole into an ochrea, extended on both sides of the petiole in an auriculate manner; flowers monœcious or polygamous. Male flowers axillary, solitary, small, greenish, shortly pedicelled, bracteolate; calyx deeply 4-partite, herbaceous-green, at length quite patent, caducous, with elliptical auriculate concave segments, margins imbricate in the ovoid bud; petals 0; stamens 4, exserted, equal, inserted at the base of the calyx-segments; filaments filiform, rather flexuous at the base, flaccid, bright red-purple, longer than the calyx; anthers 2-celled, basifixed, large, purple-black, widely and laterally dehiscing; ovary rudimentary.

Female flowers with a narrower calyx; ovary superior; style very short; stigma large, multifid-lacerated. Frequent along the bushy banks of streams near Lopollo and in the more elevated parts of Morro de Lopollo, in company with *Salix*, *Faurea*, *Rumex*, and *Rubus huillensis* Welw.; with male and female fl. and young fr. 13 and 14 April 1860. It flowers from December up to May. A form occurred with the ovaries of the female fl. resembling berries being spongy-inflated in consequence of the punctures of small insects (*Curculio*); with this form must be compared *Cliffortia baccans* Harv., which may prove to be only a state of *C. linearifolia*. No. **1277**.

XLVI. SAXIFRAGACEÆ.

1. **VAHLIA** Thunb.; Benth. & Hook. f. Gen. Pl. i. p. 637.

1. **V. capensis** Thunb. Nov. Gen. Pl. P. ii. p. 36 (1782); Oliv. Fl. Trop. Afr. ii. p. 384, n. 3 (1871).

Huilla.—General appearance much resembling the yellow-flowered narrow-leaved species of *Sedum*; root rather thick and oblique or in young plants straight and more slender, annual or apparently perennial or persisting during 2 to 4 years, but occasionally the plant flowers in its first year; stems several, 3 to 6 in. high, ascending, rather viscid-hairy or downy, much branched from the base; branches densely crowded, unequal, bearing flowers towards the apex of the approximate erect leafy branchlets; leaves rather fleshy, linear, uni-nerved; pedicels axillary, geminate; tube of the calyx hairy, half as long as the glabrescent lobes; petals yellow, as long as or longer than the calyx-lobes, lanceolate, rather acute, tender, fugacious. Very abundant in sandy, somewhat rocky secondary thickets, along the edges of forests between Lopollo and Monino; fl. and fr. Dec. 1859, 7 Jan. and Feb. 1860. No. **2375**.

Var. **verbasciflora** Oliv. Fl. Trop. Afr. ii. p. 384 (1871).

V. verbasciflora Welw. (ex Oliv., *l.c.*); B. D. Jacks. Ind. Kew. ii. p. 1164 (1895).

Mossamedes.—An annual or perennial herb, erect or ascending at the base, 1 to 1½ ft. high, branched, somewhat viscid and more or less pubescent; leaves opposite, linear, fasciculate in the axils; flowers sessile or very shortly pedicellate, very large for the genus; calyx-lobes almost twice as long as the woolly or glandular-hairy tube; petals exceeding the calyx, obovate-round, shortly clawed, yellow, dark purplish-red inside at the base, on the margin finely crenulate-denticulate and not mucronate; stamens and deep-yellow styles longer than the petals. In sandy places along the banks of the river Bero, at Mata dos Carpenteiros near Mossamedes; fl. July 1859. No. **2374**. Sporadic, in rocky-sandy places at the banks of the river Maiongo, between Mossamedes and Pedra del Rei; fl. and fr. June 1860. No. **2374***b*.

XLVII. CRASSULACEÆ.

1. **TILLÆA** L.; Benth. & Hook. f. Gen. Pl. i. p. 657.

1. **T. pentandra** Royle, Illustr. Bot. Himal. p. 222 (1839) (name only), and ex Edgew. in Trans. Linn. Soc. xx. p. 50 (1846); Britten in Oliv. Fl. Trop. Afr. ii. p. 386.

Crassula pentandra Schönl. in Engl. & Prantl, Nat. Pflanzenfam. iii. 2*a*, p. 37 (1890). *C. tillæoidea* Edgew., *l.c.*

Pungo Andongo.—An annual, erect, succulent, flaccid, branched herb, with the habit of *Scleranthus*, 2 in. high; leaves opposite, sheathing-amplexicaul at the base, fleshy, linear-lanceolate, compressed, rather obtuse or almost truncate and 1-2-denticulate at the apex, sub-denticulate and narrowly cartilaginous-translucent at the margin, lepidote-glaucescent, erect-spreading; flowers small, solitary, axillary, very shortly pedunculate, tetramerous or pentamerous; calyx-segments erect, acuminate, succulent, green; petals whitish, very thinly membranous, lanceolate, much acuminate, a little shorter than the calyx; stamens shorter than the petals; carpels 4 or 5, mucronulate; hypogynous glands obsolete or rarely 4 or 5, very small, capitate, pedunculate. Rather rare but in masses in sandy-earthy moist situations, usually flooded in the rainy season, by the side of streams near Catete and Muxillo; fl. and fr. 24 Dec. 1856. No. **2476**.

2. **T. subulata** Benth. & Hook. f. Gen. Pl. i. p. 658 *in obs.*; Britten, *l.c.*, p. 387.

Thysantha subulata Hook. Ic. t. 590 (1843).

Huilla.—A perennial herb, rather succulent, dwarf, with the habit of a *Paronychia*; rhizome tuberculiferous; stem rather fleshy, ascending or nearly erect; branches opposite; branchlets erect or ascending, leafy; leaves verticillate-fasciculate, cylindric-subulate, fleshy; flowers axillary, pentamerous; calyx green; petals herbaceous-green, lanceolate, a little exceeding the calyx, apparently connate at the base; stamens 5, shorter than the petals; ovaries 5, erect, unilocular. In black earth in the cracks of rocks, Serra de Oiahoia, near Humpata, seen only in one spot; fr. and few fl. beginning of April 1860. No. **2478**.

Var. (?) **illecebroides** (Welw. ms. in Herb.).

A glabrous herb, 1 to 3 in. high, with the habit of an *Illecebrum*, from an apparently perennial root much branched; lower branches spreading decumbent and rooting near the base, then as well as the upper branches ascending or erect, leafy; internodes short; leaves linear-lanceolate, opposite, connate at the base, forming a narrow ring round the stem or branch, more or less acute at the apex, rather fleshy, glaucous-green or marked with reddish spots, with narrowly winged whitish margins, $\frac{1}{10}$ to $\frac{1}{5}$ in. long; flowers quasi-axillary, in opposite very abbreviated about 2-flowered axillary cymes usually shorter than the leaves, pentamerous, about $\frac{1}{16}$ in. long; peduncles minute or obsolete; pedicels very short or minute, thickened towards the apex; sepals lanceolate, acute, not taper-pointed; petals rather or scarcely shorter than the sepals, ovate-lanceolate, acuminate, connate at the base; stamens rather shorter than the petals; filaments filiform, inserted on the short corolla-tube; ovaries erect, unilocular, 2-ovuled; carpels 2-1-seeded.

Huilla.—In elevated rocky situations among the mountains of Morro de Monino, amidst moss, at about 5500 ft. altitude; fl. and fr. March and end of Feb. 1860. No. **2477**.

Doubtfully distinct specifically from the last species, with which Britten had united it.

2. **CRASSULA** L.; Benth. & Hook. f. Gen. Pl. i. p. 657.

1. **C. abyssinica** A. Rich. Fl. Abyss. i. p. 309 (1847); Britten in Oliv. Fl. Trop. Afr. ii. p. 388.

Var. **vaginata** Engl. Pflanzenw. Ost-Afrik. pars C. p. 189 (1895). *C. vaginata* Eckl. & Zeyh. Enum. p. 298, n. 1903 (1837).

Pungo Andongo.—A perennial herb ; rhizome tuberous, filled with a red flesh inside, succulent throughout ; stem rose-reddish, hyaline-subglandular ; leaves glaucous, squamulose-crenulate on the margin ; flowers white ; calyx flat ; petals sub-connate at the base ; stamens 5, with reddish anthers. In the fissures of the gigantic rocks, in damp places, at Cabonda ; fl. end of Nov. 1856. No. **2479**.

Huilla.—Rhizome sub-napiform, with a few rather thick fibres descending straight ; stem erect, cylindric-purplish, 1 to $2\frac{1}{2}$ ft. high ; primordial leaves when fully developed narrowed into a petiole, 5-nerved, as well as the lower ordinary leaves lanceolate-linear, rather fleshy erect ; leaves of the flowering stem opposite, broadly linear, amplexicaul, with a closed sheath an inch long, cartilaginous-crenate on the margin, as well as the bracts and inflorescence lepidote-papillose ; flowers whitish, at length in the course of drying turning rather red. Not uncommon, in sandy-earthy thickets about Lopollo and towards Monino ; fl. March 1860. No. **2480**.

3. **CRASSUVIA** Commers. ex Lam. Encycl. Méth. ii. p. 141 (1786). *Bryophyllum* Salisb. (1806) ; Benth. & Hook. f. Gen. Pl. i. p. 658.

1. **C. floripendia** Commers., *l.c.*

C. floripendula Sims, Bot. Mag. t. 1409 (1811). *Cotyledon pinnata* Lam., *l.c.* *Bryophyllum calycinum* Salisb. Parad. Lond. n. 3 (1806) ; Britten in Oliv. Fl. Trop. Afr. ii. p. 390. *B. pinnatum* Kurz in Journ. As. Soc. Beng. xl. ii. p. 52 (1871).

Pungo Andongo.—A shrub, 2 to 4 ft. high, hard-fleshy throughout ; stem cylindrical, bright green ; leaves sometimes viviparous ; the barren ones ascending, the flowering ones erect and spotted black-purple ; flowers handsome, $1\frac{1}{2}$ to 2 in. long, pendulous ; calyx inflated, greenish with purplish lines at the base ; corolla tubular-hypocrateriform ; tube globose octagonal inflated and partly inserted within the calyx at the base, then abruptly constricted and soon again produced into an elongate-ventricose quadrangular form ; limb 4-cleft into abruptly acuminate very acute spreading lobes ; stamens 8, a little exceeding the base of the corolla-lobes ; hypogynous glands 4, broadly rectangular ; ovaries 4, almost altogether separate ; styles filiform, straight, equalling the stamens ; stigmas flat-capitate, thinly papillose. Near cataracts in Mata de Cabondo, not uncommon but rarely flowering ; fl. end of Nov. 1856. No. **2481**.

4. **KALANCHOE** Adans. ; Benth. & Hook. f. Gen. Pl. i. p. 659.

1. **K. laciniata** DC. Pl. Grass. n. 100 (1802 ?) ; Britten. in Oliv. Fl. Trop. Afr. ii. p. 392.

Cotyledon laciniata L. Sp. Pl. edit. 1, p. 430 (1753).

Huilla.—Stem erect, 3 to 4 ft. high, with deep-yellow flowers. In dry open thickets, rare ; fl. and fr. April and beginning of May 1860. No. **2482**.

2. **K. brachyloba** Welw. ex Britten, *l.c.*, p. 392.

Huilla.—An erect glabrous herb, 2 to 3 ft. high or more ; rhizome tuberous, nearly as large as a man's fist, giving off numerous somewhat woody fibres ; stem cylindrical, green ; the lower leaves opposite,

lanceolate or ovate-lanceolate, entire or remotely and sparingly denticulate or slightly repand, sheathing the stem for a considerable length, fleshy, rigid, glaucous or glaucous-pruinous, becoming green in old age, the upper part of the margin entire, red ; the uppermost leaves linear, acute ; calyx deeply quadripartite ; segments lanceolate-linear, elongated, greenish ; corolla yellow ; tube acutely quadrangular, limb comparatively short, with 4 segments ; stamens 8 ; hypogynous scales 4, erect, broadly linear, shortly acuminate, yellowish ; ovaries 4 ; young seeds elongate-cylindrical, somewhat curved, marked with numerous longitudinal furrows. In sandy thickets and in dry forests of *Parinari Mobola*, about Lopollo, Monino, and the great lake of Ivantâla, at an elevation of 5000 to 5200 ft. ; flower-bud Feb. 1860, sporadic ; fl. and fr. middle of March 1860, abundant. No. **2486**.

3. **K. platysepala** Welw. ex Britten, *l.c.*, p. 393.

HUILLA.—An annual erect shaggy herb, 1 to 3 ft. high ; stem subalate-quadrangular ; leaves entire or in a variety dentate ; flowers of a brilliant pale-yellow colour outside, especially in the bud, pubescent ; sepals ovate, connate at the base more or less, broadly acuminate, much more so than in the most closely allied species, densely shaggy-pubescent outside, ciliolate on the margin. On sparingly bushy hills along the edges of forests in the Lopollo country, abundant ; fl. and fr. April and May 1860. No. **2484**.

4. **K. Welwitschii** Britten, *l.c.*, p. 394 ; Ficalho, Pl. Uteis, p. 180 (1884).

Kalanchoe (sp.) Welw. Apont. p. 553, n. 113, and p. 592, n. 112.

LOANDA.—Stem cylindrical straight, 3 to 6 ft. high or more, almost an inch thick at the base, wholly glaucous, glabrous and quite smooth except the flowers ; radical leaves large, including a petiole of 1½ to 3 in. nearly 10 in. long, ovate or ovate-lanceolate, rounded at the base, crenate-dentate or coarsely dentate with purple-margined crenatures or teeth ; upper stem-leaves lanceolate or linear-lanceolate, entire ; calyx-segments 4, green, lanceolate, long-acuminate-subulate ; corolla of a bright sulphur-colour ; tube pyramidal, acutely quadrangular, herbaceous green towards the base ; limb 4-partite, much spreading ; partitions ovate, abruptly-acuminate, aristate ; stamens 8, 4 of them inserted at the base of the corolla-tube, the other 4 inserted a little below the throat of the corolla with their anthers almost exserted ; capsule truncate, acuminate. Sporadic, in very dry thickets and on stony slopes behind Maianga do Povo and near Cacuaco, also cultivated ; fl. and fr. 30 Sept. 1853 and July 1854. No. **2492**. A fleshy undershrub, with yellow flowers ; rare in stony places ; fr. Jan. 1858. COLL. CARP. 543.

The same and perhaps also allied species are cultivated by negro medical men, who are called "Quibanga" or "Jinganga," in Golungo Alto and Ambriz and other districts ; the negro name is "Tuta Riambula" or "Rituta ria n' vula," which means rain-cloud ; it is used for witchcraft together with *Caladium*, but Welwitsch failed to learn for what particular purpose.

Var. **gracilituba** Britten, *l.c.*

LIBONGO.—A fleshy little shrub ; stem ascending, cylindrical, nodose, hard, fleshy-fibrous, smooth, dark-green, in flower elongated and composite-corymbose ; leaves lanceolate, fleshy-thick, channelled, sordid-glaucescent, margin dentate-crenate and purplish ; flowers of a deep orange-yellow colour. In dry, elevated stony thickets between Banza

de Libongo and the petroleum mine, not uncommon ; fl. and fr. end of Sept. 1858. No. **2491**.

5. **K. ægyptiaca** DC. Pl. Grass. n. 64 (1801 ?).

Cotyledon ægyptiaca Lam. Encycl. Méth. ii. p. 142 (1786). *C. integra* Medik. in Act. Ac. Theod.-Palat. iii. p. 200, t. 9 (1775). *C. deficiens* Forsk. Fl. Ægypt.-Arab. p. 89 (1775). *C. nudicaulis* Murr. Syst. Veg. (edit. 14) p. 429 (1784). *K. crenata* Haw. Syn. Pl. Succ. p. 109 (1812) *pro parte* ; Britten, *l.c.*, p. 394.

Pungo Andongo.—Stem cylindrical, 3 ft. high or more, glabrous up to the inflorescence ; radical leaves numerous, thick, glabrous ; stem-leaves obovate-spathulate, narrowed into a rather long petiole, glabrous ; inflorescence hispidulous ; flowers of a pale-sulphur colour ; sepals lanceolate, acute, viscid. Sporadic, in rocky bushy places within the fortified lines, not far from the road leading to Cambamba ; fl. and fr. April 1857. No. **2488**.

6. **K. coccinea** Welw. ex Britten, *l.c.*, p. 395.

Golungo Alto.—An erect nearly glabrous annual (?) herb, 2 to 4 ft. high or more ; stem slender, herbaceous-green, fleshy, glabrous below, somewhat shaggy above ; leaves herbaceous-green, fleshy, less thick than in most of the other species of the genus, the lower leaves glabrous, the upper ones as well as the inflorescence somewhat shaggy ; flowers brilliantly scarlet or orange-red or even sometimes white at the time of flowering, at length when fruiting crowded into long corymbose racemes ; corolla-tube somewhat shaggy ; hypogynous scales linear, bifid at the apex. In the drier thickets and borders of woods, from Calolo towards Sange and between Chixe (Xixe) and Muria, abundant, fl. and fr. Sept. 1854 ; on thin-bushy hills on the left bank of the river Coango, fl. and young fr. July 1856 ; in wooded and in bushy places between Muria and Calolo, sparingly, fl. beginning of Sept. 1857. No. **2487**.

Bengo (Zenza) and Golungo Alto.—A very succulent perennial herb ; stem straight, 2 to 3½ ft. high ; leaves greenish-glaucous, green when fully developed, fleshy ; flowers corymbose, of a pleasant orange-scarlet colour. In dry places among trees of *Euphorbia*, etc., near Cacuaco, fr. Sept. 1854 ; near Muria, fr. Dec. 1854. Coll. Carp. 542.

7. **K. velutina** Welw. ex Britten, *l.c.*, p. 396.

Pungo Andongo.—A very fleshy, velvety-tomentellous undershrub : root thick, fleshy, creeping, perennial ; flowers softly pubescent, yellow ; calyx short, deeply partite, with deltoid acute segments ; lobes of the corolla-limb very acute, but little spreading at the time of flowering : corolla-tube scarcely or but little inflated. Rather rare, in rocky sparingly-shrubby situations near Mutollo towards Calumba ; fl. and fr. end of March 1857. No. **2490**.

8. **K. glandulosa** Hochst. in Herb. Schimp. Abyss. ii. n. 904 ; A. Rich. Fl. Abyss. i. p. 312 (1847) ; Britten, *l.c.*, p. 396 ; Engler, Hochgebirgsfl. p. 233 (1892).

Var. **benguelensis** Engl., *l.c.*

Huilla.—A perennial herb ; root tuberous ; stem erect, 1½ to 2 ft. high, tetragonal, densely clothed with glandular hairs ; radical and lowest leaves very large, a foot long, broadly elliptic-ovate, very thick, fleshy, very brittle, opaque and very thinly papillose above, smooth paler shining and keeled beneath, coarsely dentate on the margin :

upper leaves lanceolate from an amplexicaul base, coarsely dentate from the middle to the apex; calyx deeply 4-cleft, densely glandular, with erect long-acuminate lobes; corolla pale-yellow; corolla-tube acutely quadrangular; lobes of the limb elliptic-ovate, cucullate-apiculate at the apex; stamens 8 of which 4 are inserted lower than the others, included; hypogynous scales 4, well developed, linear, obtuse; ovaries 4, erect, free, unilocular. In elevated stony parts of Morro de Lopollo (Monino); flower-bud 6 April, fl. April and May 1860. No. **2485**.

9. **K. scapigera** Welw. ex Britten, *l.c.*, p. 397.

Mossamedes.—A suffruticose, fleshy, quite glabrous herb; root thick, oblique, 1-3-headed; stem cylindrical, an inch high, transversely rugose with the scars of fallen leaves; leaves obovate obtuse subpetiolate or occasionally subsessile and suborbicular, very thick, subrosulate at the apex of the stem, reddish or of a yellow-copper colour; peduncles scapiform, arising from the rosette of leaves, solitary or two together, 5 to 9 in. long, straight, cylindrical, occasionally furnished with 2 opposite deciduous bracts, bearing at the apex 1 to 3 little cymes; pedicels $\frac{1}{12}$ to $\frac{1}{4}$ in. long, rigid, furnished with thick lanceolate almost triquetrous bracteoles; flowers deep-yellow, rather fleshy, brittle; calyx-segments very short, oval-deltoid, rather obtuse, gibbous on the back, several times shorter than the quadrangular corolla-tube; stamens 8; hypogynous glands 4, filiform-linear; ovaries gradually acuminate, at length dehiscing on the inner side, many-ovuled. On the summit of the mountains of Serra de Montes Negros, seen in only one stony spot; a few specimens in fr. and one in fl. 10 August 1859. No. **2483**.

5. **COTYLEDON** Tournef., L.; Benth. & Hook. f. Gen. Pl. i. p. 659.

1. **C. orbiculata** L. Sp. Pl. edit. 1, p. 429 (1753); Britten in Oliv. Fl. Trop. Afr. ii. p. 398.

Mossamedes.—A beautiful, pruinose-glaucous, fleshy, brittle shrub, 1 to 2 ft. high; stem straight or ascending, woody, $\frac{1}{3}$ to $\frac{2}{3}$ in. thick, transversely rugose with the scars of fallen leaves; branches dichotomous, cæspitose, spreading, undulating, pale-brown, shortened, densely leafy; leaves in 4 rows decussate, obovate-spathulate, fleshy, very thick, subsessile, glaucous, spread all over with easily separable quite white meal, turning red at the obtuse apex; flowers red, terminal, cymose; peduncle cylindrical, 4 to 7 in. long, scape-like, with opposite bracts at the base and above the middle, as well as the pedicels and calyx white-mealy. Abundant, on the sides of lofty almost vertical rocks composed of sandy mica-schist, along the banks of the river Maiombo, about 15 miles from the coast, chiefly between Páo and Bisapa, rather rare between Páo and Pedra Rei; fl. and young fr. 7 June 1860. Altitude 100 to 300 ft. No. **2489**.

XLVIII. DROSERACEÆ.

The Droseraceæ of Angola are essentially highland plants. Even in the hilly region, where a moist atmosphere and spongy ground are certainly not rare, Welwitsch did not find a single species, and it was only about 15° S. lat. at an elevation of 5000 to 6000 ft. that several species were met with. *Drosera indica* L. descends lowest, namely to 3200 ft., but the geographical distri-

bution of this species is much wider than that of the others; farther north, several degrees nearer the equator, this species occurs in the coast region, but very rarely; a small stunted form was discovered in the swampy forest near Quizembo in the Ambriz district.

All the species found are probably perennial, although *D. indica* L. has quite the appearance of an annual plant. Numerous small bulbs or tubercles are developed just below the surface of the ground, and under the shelter of *Scytonemata* and mosses seem to produce the future flowering plants; a similar condition occurs in the case of several Scrophulariaceæ, Utricularieæ, etc.

1. **DROSERA** L.; Benth. & Hook. f. Gen. Pl. i. p. 662.

1. **D. Burkeana** Planch. in Ann. Sc. Nat. Ser. 3, ix. p. 192 (1848); Oliv. Fl. Trop. Afr. ii. p. 402.

Huilla.—A biennial or perennial herb; leaves almost naked on the lower face; scapes many times longer than the leaves, glandular-puberulous as well as the inflorescence; flowers deep-purple. In wet spongy wooded meadows between Lopollo and Monino, in company with species of *Burmannia*, *Xyris*, and Gentianaceæ (*Faroa salutaris* Welw. and *Exochœnium primulæflorum* Welw.); fl. and fr. Feb. 1860, not uncommon. No. **1184**. In spongy meadows near Monino, in company with Gentianaceæ and Cyperaceæ and with the last; fl. and fr. Jan. and Feb. 1860. A larger form, including some specimens with whip-like scapes. No. **1184***b*.

2. **D. affinis** Welw. ex Oliv., *l.c.*, p. 402.

Huilla.—A marsh herb, with the habit of *D. anglica* Huds., but more or less caulescent, smooth on the petioles and scapes; flowers blue-purple; calyx glandular-pubescent, its lobes densely ciliate or hispidulous-ciliate and in fruit divaricate. Abundant in swamps and marshy places alongside streams near Lopollo; fl. and fr. Dec. 1859 and Jan. 1860; also sparingly in swampy spongy wooded places with *Scytonemata*, about Lopollo; fl. and fr. Jan. and April 1860. No. **1183**.

3. **D. indica** L. Sp. Pl. edit. 1, p. 282 (1753); Oliv., *l.c.*, p. 402; Welw. Apont. p. 555 under n. 122; Welw. in Journ. Linn. Soc. iii. p. 154 (1859).

Pungo Andongo.—Stems quite simple in most cases, only in one out of 50 specimens collected with a branch near the base; petiole minutely muricate; flowers purplish, fugacious; peduncles circinate when young, patent and arching ascending in fruit; pedicels erect-secund. In sandy-earthy pastures and in spongy hot wooded rich places with *Scytonemata*, at the banks of the river Cuanza, not uncommon, in company with *Ascolepis elata* Welw. No. 1670; fl. and fr. Jan. to March 1857. No. **1179**. In sandy very shortly grassy places near Candumba; fl. beginning of Jan. 1857. No. **1179***b*.

Huilla.—A very elegant shortly caulescent little herb, apparently annual, with rather large flowers; petals almost twice as long as the calyx, much contracted in drying; sparingly, in moist shortly grassy pastures between Lopollo and Humpata; fl. and fr. 21 March 1860. No. **1180**.

4. **D. ramentacea** Burch. ex DC. Prodr. i. p. 318 (1824); Oliv., *l.c.*, p. 403.

HUILLA.—A herb, apparently perennial, more or less caulescent; root consisting of elongated cylindrical fleshy brittle tubercles; leaves strigulose-pubescent beneath; petioles scapes and inflorescence clothed with a rufous-hoary pubescence; flowers blue-purple, very variable in size. Abundant in spongy woods by the banks of streams between Lopollo and the great lake of Ivantâla and towards Quilengues, fl. and fr. Jan. 1860; also weaker forms in bogs of *Sphagnum* at the base of Morro de Monino, fl. and fr. March 1860. No. **1182**.

5. **D. flexicaulis** Welw. in Oliv. Fl. Trop. Afr. ii. p. 403.

HUILLA.—A biennial or perhaps perennial herb; rhizome composed of elongated fleshy cylindrical fasciculate tubercles; stems erect, slender, filiform, regularly flexuous, sparingly leafy, 4 to 8 in. high, glabrescent as also the petioles which are a little longer than the obovate-spathulate leaf-blade; inflorescence racemose, sub-secund; peduncle capillary, elongated, starting in a curved course within the rosette of uppermost leaves, then straight, slender, glabrous, as well as the stems shining-atropurpureous; pedicels and calyx pubescent; flowers (as in several other species of the genus) variable in size, the larger ones almost double the smaller; calyx-segments barbulate-ciliolate on the margin; petals always longer than, sometimes twice the length of, the calyx. Abundant, in elevated spongy wooded parts of Morro de Lopollo, about Quipaca Velha, at an elevation of 5500 ft.; fl. Nov. and beginning of Dec. 1859. No. **1181**. Fruiting specimens in the same locality but at an elevation of 6000 ft. in company with species of *Disa* and *Utricularia*, end of Dec. 1859. No. **1181***b*.

XLIX. MYROTHAMNACEÆ.

1. **MYROTHAMNUS** Welw.; Benth. & Hook. f. Gen. Pl. i. p. 1005.

1. **M. flabellifolius** Welw. in Journ. Linn. Soc. iii. p. 155 (1 Feb. 1859); Welw. Apont. p. 578, Nota 8; Welw. Synopse, p. 26, n. 58; Welw. Sert. Angol. p. 23, t. viii. (*flabellifolia*); Oliv. Fl. Trop. Afr. ii. p. 404; Ficalho, Pl. Uteis, p. 180 (1884); Engl. Hochgebirgsfl. p. 233 (1892).

PUNGO ANDONGO.—A bush, 1 to 7 ft. high, prostrate or ascending or even strict-erect; trunk attaining 16 in. in diam. at the base. Much branched and very agreeably aromatic throughout, sometimes laden with specimens of *Parmelia perlata* Ach. (Welw. Lichen n. 114). On the summit of Pedra Songue and in elevated rocky places in Serra de Pedras de Guinga, at an elevation of 3500 ft.; fl. Jan. and young fr. March 1857, abundant; a low prostrate form near Funda Quilombo. No. **1279**. A specimen of the wood, March 1857. COLL. CARP. 544.

HUILLA.—An erect aromatic dicœcious shrub, in this region at an altitude of 4500 to 5500 ft., 1 to 2½ ft. high, branched towards the apex; leaves glandular, flowering branches with persistent scales; in very elevated rocky woody places, near Lopollo and in Morro de Monino; fl. Dec. 1859, fr. April 1860. No. **1278**. Stamens monadelphous; anthers 4 to 6, usually 5, basifixed, clustered in a head at the apex of a stipes, with very short filaments. In elevated wooded places in Morro de Lopollo; fr. May 1860. COLL. CARP. 545.

All the parts of this shrub and especially the branchlets and leaves contain a resin of very pleasant odour like that in certain species of *Myrica*. The natives in Pungo Andongo employ the shoots in the form of a cold or warm infusion to cure headaches and in the form of

fumigations in the treatment of rheumatic pains and sudden paralysis; also the Portuguese colonists hold in high esteem its medicinal virtues and keep its dried branches instead of incense to perfume their houses; it is probable that it is on this account that the colonists give it the name of "Alecrim das paredes" (wall-rosemary), though in habit it is very little or not at all like the rosemary of Portugal. The native name is "Cachinde-Candange." (See Welwitsch, Synopse, p. 26, n. 58.)

Welwitsch latterly thought that this plant was the type of a new Natural Order allied to Salicaceæ, and Engler has adopted the name Myrothamnaceæ.

L. HALORAGEÆ.

1. **SERPICULA** L.; Benth. & Hook. f. Gen. Pl. i. p. 675.

1. **S. repens** L. Mant. Pl. (i.) p. 124 (1767); Oliv. Fl. Trop. Afr. i. p. 405.

Var. **brachypoda** Welw. ms.

A herb, perennial or at least lasting for several years; rootstock becoming more or less woody, densely fibrillose; stems red, cylindrical, decumbent-rooting, crowded; the flowering shoots leafy, erect or ascending; leaves alternate, linear-lanceolate, rather obtuse, more or less congested towards the apex of the shoots; flowers clustered in the axils of the leaves, polygamous, very small, the upper ones male or hermaphrodite, few and shortly pedicellate, the lower ones female and mostly without petals; calyx adnate to the ovary, with a superior 4-cleft limb; petals 4, valvate, rather erect, closely embracing the anthers in the bud, inserted on the calyx, alternate with its lobes, red, more than twice as long as the calyx-lobes; stamens 4, alternate with the petals; filaments filiform, very slender; anthers oblong-linear, almost as long as the petals, 2-celled, longitudinally dehiscing; pollen whitish; ovary inferior, in the male flowers barren, in the female flowers globose-ovate; stigmas 4, sessile, papilliform, red, erect.

In habit like the type of the species, but the male flowers subsessile or very shortly pedicellate, and the plant rather glabrous or usually hirtulo-pubescent, the pedicels much shorter than the flowers and many times shorter than the leaves; leaves entire or towards the apex with a few teeth directed upwards and unequal. The whole plant always more or less reddish, sometimes dwarf, $1\frac{1}{2}$ to 2 in., sometimes reaching a foot or more and then with broader and often dentate leaves.

Huilla.—In swampy places at the banks of the river Quipumpunhime, in Humpata, in company with species of *Lobelia*, other Campanulaceæ, *Utricularia*, etc.; fl. Oct. 1859. No. **1621***a*. Very abundant in swamps throughout the district, in company with species of *Trifolium*, *Limosella*, etc.; fl. Nov. and Dec. 1859 and Jan. 1860. Various forms with entire and toothed leaves at the banks of the river of Lopollo, between 4000 and 5000 ft. alt., Nov. and Dec. 1859. No. **1621***b*.

In Apont. p. 569 under n. 167, Welwitsch states that he met with on the banks of the river Dande a plant without fructification which probably belonged to the genus *Myriophyllum*; unfortunately the

specimens were lost during his passage by night across the river Bero; these were two specimens with foliage collected in Nov. 1853, and in 1855 he searched the margins of the river Dande, but failed to find the plant again; further consideration led Welwitsch to the conclusion that he may have been mistaken in referring the specimens to *Myriophyllum*.

LI. RHIZOPHORACEÆ.

1. **RHIZOPHORA** L.; Benth. & Hook. f. Gen. Pl. i. p. 678.

1. **R. Mangle** L. Sp. Pl. edit. 1, p. 443 (1753); Welw. Apont. p. 568 under n. 165; Ficalho, Pl. Uteis, p. 181 (1884).

Var. **racemosa** Engl. in Mart. Fl. Bras. xii. part ii. p. 427 (1876).

R. racemosa G. F. W. Meyer, Prim. Fl. Esseq. p. 185 (1818); Oliv. Fl. Trop. Afr. ii. p. 408.

AMBRIZ.—A shrub or sometimes a tree attaining 20 ft. or more; in masses about the mouth of the river Loge near Ambriz; sparingly in fl. Nov. 1853. No. **2497**.

LOANDA.—Wood rose-red, afterwards turning pale; peduncles 1 to 2-, usually 2-flowered, fruit clavate-cylindrical-conical; embryo germinating in the fruit and after its fall taking root in maritime mud; occasionally 2 embryos were seen in one and the same ovary, both germinating. Abundant and highly gregarious along the Atlantic coast near to Loanda, as for example at Praia do Bispo fr. June 1854, at Cabo Lombe fl. and fr. July 1854, and at Praia do Zambe Grande fl. and fr. beginning of August 1854. Fl. nearly the whole year. No. **2496**. COLL. CARP. 546.

The Mangrove is abundant on the sea coast in muddy and sandy situations, (but nowhere seen in rocky places,) near Ambriz, Lifune, Dande, Bengo, Loanda island, and at the mouth of the Cuanza; it is mostly a dense shrub or bush of 8 to 10 ft. often only 5 ft. high, but occasionally a tree reaching 30 ft. or more, as for instance at the mouth of the river Loge; it appears to prefer a mixture of fresh and sea water about its roots, for at the mouths of rivers it becomes a tree of considerable height and thus gives a stately appearance to the estuaries, although it rarely acquires a fine head; it frequently grows mixed with *Laguncularia racemosa* Gaertn. and *Avicennia officinalis* L. The wood is considered valuable for various building purposes, and that of the bush-form is mostly used for firewood, but it is not very good fuel; the bark abounds in an astringent ingredient, fit for tanning leather. The leaves are bright-green above and yellowish-green beneath; the flowers are of moderate size, tetragonal-pyramidal in bud, and of a pleasant sweet-acid odour; the calyx and corolla are waxy-rigid and of a sulphur-yellow colour; the calyx is constantly 4-parted. I follow Welwitsch's matured opinion in referring his specimens to *R. racemosa*.

Welwitsch observed at the very mouth of the river Loge near Ambriz some tall trees with a trunk bare for some height in the lower part and at the apex forming a loose head, of which he could not gather specimens, but which he regarded as belonging to a quite different species.

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